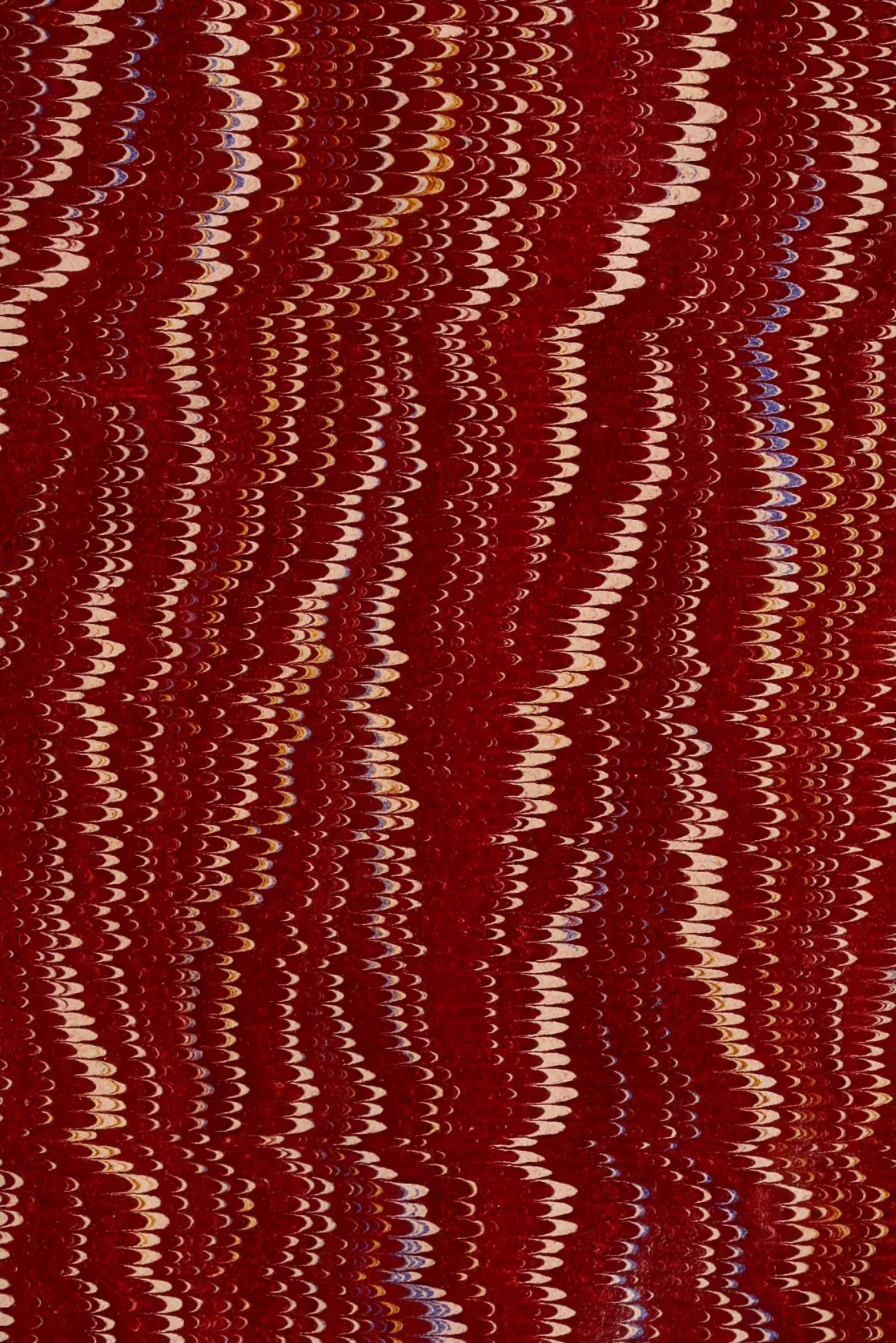


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THE
EDINBURGH MEDICAL JOURNAL

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WILLIAM GREEN AND SONS
EDINBURGH

EDINBURGH MEDICAL JOURNAL

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The Scottish Medical and Surgical Journal

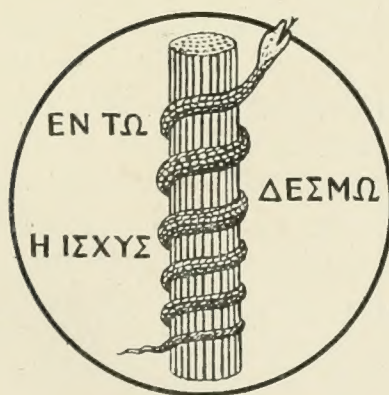
EDITED

BY

ALEXANDER MILES & J. S. FOWLER

NEW SERIES

VOL. VIII



Printed and Published for the Proprietors by

WILLIAM GREEN & SONS

EDINBURGH AND LONDON

1912



EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

The National Insurance Act.

Now that the National Insurance Act has been placed on the Statute Book, the medical profession is brought face to face with a problem the solution of which will determine for good or evil the status of Medicine in this country for at least a generation.

There is no longer room for doubt that the great body of the profession throughout the country is thoroughly dissatisfied with the provisions of the Act, in so far as they relate to the administration of medical benefit.

When the British Medical Association opened the campaign—and we fully and frankly acknowledge the invaluable aid the Association rendered in awakening the profession to the dangers of the situation, and in rallying it to the defence of its interests—the terms on which the members of the profession were willing to take their share in working the scheme were clearly intimated to the Government. These claims were reasonable; they were not stated as a basis for bargaining but as an irreducible minimum; and although they have not been conceded, they are as essential as ever.

An honest and strenuous effort was made by those who represented us in the negotiations to secure such changes in the Bill as were necessary to make its provisions consistent with the claims we put forward. There may be room for difference of opinion as to the wisdom of the tactics employed by our representatives at certain stages of the discussion, and some of their actions have even given reasonable grounds for adverse criticism, but of their *bona fides* there is no doubt, and it would be grossly unfair to attribute our failure to them alone. The hope that the members of a single profession, scattered throughout the country, with no collective political power, would succeed in thwarting the most subtle and astute politician of our generation, was, as we now see, from the outset small. The general political situation was also unfavourable to us, and lent a fictitious strength to our opponents. Other factors may have contributed to our want of success, but that we have up to the present failed to secure the concessions we aimed at there is no doubt. Those, however, who suppose that this set-back spells defeat, realise neither the motives which actuate the profession nor the spirit which animates it.

Failure has united us and strengthened our determination to hold together in a way which even success would not have done. The reiterated statements of politicians that the "six cardinal points" are all attainable under the provisions of the Act, fail to convince us, and the sophistry that "there is no legal barrier against the profession securing the fulfilment of its entire policy" leaves us cold.

The time has now come for the profession to decide upon the further policy it is to pursue. Nothing short of the six cardinal points can be accepted, and the only question at issue is how they are to be enforced. Either we must intimate to the Commission once and for all that, until provisions are formulated which fully meet our demands, we can take no part in the formation of the statutory committees, or in providing the medical attendance promised in the Act; or we must go forward and co-operate with the Commissioners in the hope that we shall be able to exert such influence as will induce them to yield what Parliament has refused. The first of these alternatives is, in our opinion, the right one. If medical men can but agree to adopt it, a united profession will meet with the Commissioners on equal terms and carry their points. If the second course be followed, the proceedings will degenerate into a series of local conflicts between isolated groups of doctors on the one hand, and the whole machinery of the Act on the other. Two elementary principles underlie all warfare: that the attack has an advantage over the defence; and that the combatant who divides his army is likely to be beaten in detail. The second course ignores both these principles, and for that reason it is not difficult to prophesy what its issue would be.

We therefore see no reason to depart from the opinion we have previously expressed that we shall best consult the dignity of the profession and the interests of the public if we declare now that we shall take no part in working the Act until our claims are satisfactorily met.

In taking up this position it must be made quite clear to the general public that such a course in no sense implies anything of the nature of a strike of doctors. No sick person shall lack medical aid for one hour, but those who come under the provisions of the Act will be made to understand that the doctor they summon is in attendance as their private medical adviser and not as a government official. Circumstances have conspired to place it within the power of the medical profession to render yet one more signal service to the State, by insisting that the medical benefits of this Act shall be adequate, efficient, and just to all concerned.

**The Insurance
Commissionership.**

THE Council of the British Medical Association has been loyally supported by medical men throughout the present crisis. It appealed for their confidence and obtained it: it asked for pledges and they were given. It got a free hand to do its best for those it represents. It has responded to the trust by allowing one of its chief permanent

officials to accept an important position under an Act which the medical profession detests, and has thus alienated the rank and file of its supporters and weakened the confidence reposed in it. In sanctioning Mr. Smith Whitaker's acceptance of the post of Insurance Commissioner the Council has blundered badly. To ascribe so serious a tactical mistake to mere ineptitude or lack of political prescience would be doing scant justice to their business capacity. On the evidence before us it would be an equal injustice to assume that the Council's strategy has been deliberately planned with this object in view. If, then, as we are entitled to suppose, the appointment to the Insurance Commissionership was not an integral part of the policy of the Council, the widespread feeling which it has evoked and the almost universal condemnation with which the Council's action has been greeted, stand apart entirely from whatever criticism the general policy of the Association deserves. It is therefore a duty to state plainly where, in our opinion, the Council went astray.

They made two great mistakes. The first and the greater was in undertaking a responsibility which it was neither their right to incur nor their duty to accept—the responsibility of deciding for Mr. Smith Whitaker what was essentially a matter for his personal, private judgment. Then, having determined to relieve their secretary of a delicate task, instead of deciding for him in accordance with the ordinary canons of right and wrong as understood by the average straightforward man, their settlement of the matter was a piece of the merest opportunism, and they defend it only on grounds of expediency.

The position into which the Council have allowed themselves to drift is no unfamiliar one. To conciliate a powerful adversary by giving him a position of consideration, to gag a formidable critic with office, is an obvious political device, and if the doing of this also drives a wedge of dissension into the opposing ranks, and at the same time secures an efficient servant for the State, the practical statesman who neglects his advantage is but a fool. And the Chancellor of the Exchequer is an exceedingly clever man. On 20th November he intimated to Dr. Maclean that he had laid Mr. Smith Whitaker's name before the Prime Minister as an Insurance Commissioner. On the 27th he renewed his offer of the post, and Dr. Maclean so far committed himself in answer to the skilfully posed question, "Will you take the responsibility of advising the Medical Secretary not to accept this offer?" as to volunteer that the Council would consider the position. In the interval between the two offers came the general meeting, at which Dr. Maclean inveighed against certain vague "smoking-room" rumours, and secured the applause of his hearers by saying "that an allegation of that kind is the measure of the man who makes it." What, it is now pertinent to ask, were these unspecified rumours which called forth so vigorous a denunciation? Surely Dr. Maclean is not so ingenuous as to suppose that when a Cabinet Minister submits to the

Premier a nomination for an important Government appointment, the nomination is likely to fall to the ground on the mere intimation by a third party of certain obvious difficulties. The position was much more accurately gauged by the Medical Secretary in the remark that "the question of accepting the offer did not arise at that time."

The facts are perfectly simple. The Council of the Association, assisted by their Medical Secretary, have engaged in a long and difficult negotiation with the Government. Admittedly, they have not carried their point. Under the Act the negotiations will be transferred to the Insurance Commissioners, and the Medical Secretary is allowed by the Council to take a position on that body. The sophist may argue as long as he pleases, the plain man will shrug his shoulders and form his own opinion. Such a proceeding is inconsistent with the best traditions of British public life and unworthy of an honourable profession: it can bring nothing but disaster to its authors and retribution to a party which unprotestingly follows their lead. On these grounds alone we might confidently submit the action of the Council to the tribunal of public opinion, but even from their own standpoint their act is open to an obvious criticism.

We are sure that the country has secured a good servant in Mr. Smith Whitaker. He has proved himself a most efficient Secretary: he is a past master in the science of administration and the arts of diplomacy. We pay him the compliment of believing that he will be as zealous now to serve the State as he has been in defending the interests of the profession in the past, and with all sincerity do we believe that he still has these interests at heart. Not in the smallest particular do we question the propriety of his action: that was a matter involving his personal interests which was for his private judgment alone. But let us not blink facts: hitherto the rights of the profession have been his first care, now they must come second. In the same measure as he has served the Association faithfully, so will he, as a man of honour, serve his new masters. His prime duty is to administer the Act, to make it work well, and those who hope most from his presence among the Commissioners should remember that although he knows the strength of the profession he also knows its weakness.

Recent Reports on Tuberculosis.

THE past months have brought numerous indications that the immense significance of tuberculosis to the community begins to be widely recognised in practical fashion. Three official documents, just issued, contain matter for illuminative study. These are the Reports respectively of the Canadian Royal Commission on Tuberculosis, of the Local Government Board for Scotland regarding pulmonary phthisis in Glasgow, and of the Chief Medical Officer of the Board of Education for 1910.

The Report of the Canadian Royal Commission is scientific and businesslike. Its statement of the essential and contributory causes of tuberculosis is good, and the summation of the preventive measures which are needful could not be much better. The report is one of the most advanced and practical official declarations we have come across. It is particularly worthy of note that, after urging the need for an educational campaign, compulsory notification of tuberculosis, disinfection of dwellings, bye-laws against expectoration in public places, anti-tuberculosis dispensaries, hospitals for open cases of tuberculosis, medical inspection of schools, condemnation of unhealthy dwellings, and the creation of sanatoria, farm colonies, open-air schools, etc., the Commission proceed specifically to recommend to the Government "that the Provincial Board of Health be the central authority which will direct the application of the means of combating tuberculosis, and to that end that it be given a sufficient appropriation to establish a *special department for tuberculosis*, with the necessary staff. That department should be *under the direction of a physician of acknowledged competence in the matter*, who would apply all the educational means mentioned in the report, inspect the anti-tuberculosis institutions, and strive to have others established to complete the anti-tuberculosis armament, compile statistics, and submit a yearly report on his administration and on the results of the campaign against tuberculosis."

The Report of the Local Government Board reveals in striking fashion the difficulties attendant on any attempt at administrative control of tuberculosis in the contracted dwellings of the poor, *in the absence of a sufficiently systematised and practical plan to meet the various issues*. The detailed records, which have been collected with care, are similar to those readily obtainable in any large centre where the methods of domiciliary visitation and treatment are inchoate and fragmentary. The deduction to be drawn is not, as sometimes suggested, that tuberculosis cannot be combated in, or excluded from, houses of one or two rooms, but that the present medical resources, in most large centres, are utterly disproportionate to the need and correspondingly futile. The records strikingly illustrate the call for the adoption of the systematic plan of activities which have developed from and around the tuberculosis dispensary. Such a collection of depressing records is hardly conceivable in Edinburgh, which during more than twenty years has been gradually penetrated by an effective network of medical surveillance and treatment. The point is that the tuberculosis dispensary must not be a formal office, but the centre of a vital, vigorous machinery. It must, as insisted on by its founder, be the base of anti-tuberculosis operations. It constitutes the receiving-house, sorting-house, clearing-house, centre of home treatment and domiciliary investigation (especially through the examination of "contacts"), and the storehouse of facts and statistics.

The Report of the Chief Medical Officer of the Board of Education deals with the subject especially from the point of view of childhood. Sir George Newman quotes Dr. Philip's opinion that thirty per cent. of school children present stigmata of tuberculosis, and indicates that the returns made by the school medical officers are undoubtedly too low, and if to these were added "all cases of acute tuberculosis (in hospital or elsewhere) and all tuberculous cases absent from school or in special schools the total number would be far higher. Even so it would not include the still larger group of doubtful or missed cases, pre-tubercular cases, and children exposed to infection from relatives or neighbours." Arguing from this standpoint, Sir George Newman makes a strong case for the national adoption of the Edinburgh Co-ordinated Scheme for the prevention of tuberculosis, including (*a*) notification; (*b*) the tuberculosis dispensary; (*c*) provision for the treatment of children; (*d*) the sanatorium for early cases; (*e*) the farm colony for working patients; (*f*) the hospital for the isolation and treatment of advanced cases. He is decidedly in favour of the provision of educational advantages for tuberculous children, either in schools attached to hospitals and sanatoria or in special open-air day-schools. The School Board of Edinburgh will find it difficult to reconcile their recent decision regarding the school for tuberculous children with the conclusions of the report of the Chief Medical Officer.

THE first of these lectures was delivered in the
 The Sir John Struthers Anatomical Lectureship. Hall of the Royal College of Surgeons on 17th
 November 1911 by Professor Arthur Keith of
 London.

By his will the late Sir John Struthers, a former President of the College, bequeathed a sum of £500 to the Royal College of Surgeons to found a lecture to be delivered every third year and to be known as the Sir John Struthers Anatomical Lectureship.

Under the deed of gift "The subject of the lecture may be in any part of human anatomy or in any part of comparative anatomy within the vertebrata, naked-eye anatomy or microscopical, embryological or developed—normal anatomy understood, not pathological. It may consist either of original matter not already published, or may be an account of the progress of anatomical science or of some department of it within a period, or it may relate specially to the history of anatomy in Edinburgh or in Scotland or other place or country."

The lecturer is to be chosen by the President's Council, and "may be any person, without restriction as to country or profession, who has done and published noteworthy original research work in one or more of the above-mentioned departments of anatomical science."

The lecturer shall be bound to publish his lecture, or a full abstract of it, in some British periodical.

The next lecture falls to be delivered in 1914.

ANATOMY IN SCOTLAND DURING THE LIFETIME
OF SIR JOHN STRUTHERS (1823-1899).*

BEING THE FIRST SIR JOHN STRUTHERS ANATOMICAL LECTURE
DELIVERED AT THE ROYAL COLLEGE OF SURGEONS OF
EDINBURGH, 17TH NOVEMBER 1911.

By ARTHUR KEITH, M.D., LL.D., Aberdeen.

MR. PRESIDENT AND FELLOWS OF THE COLLEGE,—On the 20th of February 1899, four days before his death and on the last day of his 76th year, Sir John Struthers added a codicil to his will making provision for the delivery of a lecture on anatomy every third year in connection with this college. In that codicil he associated the subject to which he had devoted 54 years of his life with the college which, in the words of the late Mr. Joseph Bell, “he loved with a passionate and touching devotion.” You have bestowed on me, one of his old pupils, the high honour of giving the first lecture.

The lifetime of Sir John Struthers covers one of the most progressive periods in the history of human anatomy. When he began the study of medicine here in 1841 the majority of anatomists were followers of Paley, the theologian; the development of the human embryo was almost unknown; the body was supposed to consist of “textures” and “humours”; the deeper and more vital parts were supposed to lie beyond the surgeon’s endeavour: fossil remains of man were unknown. He lived to see all these things change. One by one the anatomists became followers of Darwin the evolutionist, little by little the history of the human embryo

* My chief sources of information have been the following:—The past volumes of this *Journal*, especially those between 1830-1860, where there is to be found not only a full account of the work done by Scottish, but also by French, German and Italian, anatomists; *Natural History Review* (1854-1865); *Journal of Anatomy and Physiology* (1867-1900); *Historical Sketch of the Edinburgh Anatomical School*, by John Struthers, M.D., Edinburgh, 1867 (see also *Edin. Med. Journ.*, 1867, vol. xii. pp. 289, 431, 539); *Letters of Sir Charles Bell to his Brother, George Joseph Bell*, London, 1870 (see also Sir William Turner’s extracts in *Journ. Anat. and Physiol.*, 1869, vol. iii. p. 117); *Life and Writings of Robert Knox*, by Henry Lonsdale, London, 1870; *The Anatomical Memoirs of John Goodsir*, edited by William Turner, with a biographical sketch by Henry Lonsdale, 2 vols., Edinburgh, 1868; “An Address on the Occasion of the Opening of the New Home of the Royal Society of Edinburgh,” by Sir William Turner, Nov. 1909.

became known and its stages modelled; under the microscope the "textures" were slowly resolved into vital units or cells; the discovery of anesthetics and of antiseptic methods made even the deepest parts of the body accessible to operation and to investigation; from time to time discoveries were made of fossil remains which extended the origin of man further and further into the past. In the world of human anatomy a revolution had taken place, and in that revolution we shall see that Scotland played her part and had nowhere within her borders a more courageous rebel than the founder of this lecture, Sir John Struthers.

THE ANATOMISTS IN EDINBURGH IN 1841.

In surveying the men in Scotland who were making a special study of the human body when John Struthers, as a Dunfermline youth of 18, commenced the study of medicine here in 1841, there is no need to go beyond the bounds of Edinburgh. The professor of anatomy in Glasgow was merely marking time: the chairs at St. Andrews and at my own college, Marischal College, Aberdeen, were then being filled by men from this school. The Scottish anatomists were centred in Edinburgh; only Berlin and Paris could show a group of workers that could stand a comparison with the men then in the Scottish capital. In the University there were Sir Charles Bell, then a man of 67, a surgeon by profession but an anatomist at heart; Alexander Monro, the third of his dynasty, also a man of 67, the professional anatomist in the University; James Spence, his demonstrator, aged 29; James Y. Simpson, newly appointed to the Chair of Midwifery, and, although only in his 30th year, already widely known as an anatomist. Outside the University, grouped round Surgeons' Square, making a livelihood as best they could, were Robert Knox, aged 51, one of the most gifted and wayward of Edinburgh's sons; Allen Thomson, aged 32, just returned from Aberdeen; Dr. Hughes Bennett, and many more of whom I need only mention two—Dr. Peter David Handyside, medical missionary, surgeon, and anatomist, aged 33, and Dr. Henry Linsdale, the biographer and historian, then in his 25th year. Last and greatest comes John Goodsir. In 1841, at the age of 27, he gave up assisting in his father's practice at Anstruther, and was appointed by this college conservator of its museum, in succession to "the accurate MacGillivray," as Darwin named him, who had been appointed to the Chair of Natural History in Marischal College, Aberdeen.

These were the anatomists in Edinburgh when Struthers commenced his career.* In his first year he studied anatomy with Allen Thomson; in the following year (1842) Allen Thomson was appointed to the Chair of Institutes of Medicine in the University, and Struthers went to a new school, formed by Handyside, Spence, and Lonsdale. There we shall see that he became heir, not only to the traditions of the Knox school, but also to part of Knox's museum.

CHARLES BELL.

Never in the whole history of medicine were two men so opposite in character brought face to face in one place and at one time as Charles Bell and Robert Knox. In 1841 their suns were setting; in 1842 Sir Charles Bell died and Robert Knox had to leave the lime-lights of Edinburgh to lead the life of a wandering Ishmaelite. Our business is merely to see what they did to increase our knowledge of the structure of the human body, and, as far as concerns Sir Charles Bell, the story is soon told. He found, soon after he left Edinburgh (1803) and started a venture school of anatomy in London, that men could give no reasonable explanation of the division of our central nervous system into cerebrum, cerebellum, and spinal cord, nor could they explain the

* Sir John Struthers was born on 21st February 1823 at Brucefield, a small estate now on the northern outskirts of Dunfermline. His father was a prosperous flax-spinner. The writer visited Brucefield last autumn. The house stands on a knoll amongst trees, and the additions which were made to it in the early part of last century show that its owner must have had command of money. The old flax-mill is used as farm buildings by the present tenant. Sir John Struthers as a student was in easy circumstances when compared with the majority of his contemporaries. He was educated at home, and was for a few months in business. He was turned towards medicine by reading *The Constitution of Man*, by George Combe, a disciple of Spurzheim, the phrenologist. When George Combe died he left a request that Dr. Struthers should examine his brain—a request which was carried out under peculiar difficulties. Beginning his studies in 1841, Sir John Struthers graduated in 1845, and went to London on a visit. He was recalled by Dr. Handyside and Mr. Spence to take Lonsdale's place in the extra-mural school at No. 1 Surgeons' Square. He borrowed £250 from his father and took his fellowship of the College of Surgeons. In 1846 Spence retired, Handyside and Struthers going to 11 Argyle Square; in 1847 Handyside retired, leaving his partner with his museum and sole extra-mural teacher in anatomy. In 1849 the extra-mural teachers concentrated in Surgeons' Hall. In forming this school Sir John Struthers took a leading part. He remained with it until he went to Aberdeen in 1863. In 1854 he was appointed assistant surgeon to the Royal Infirmary.

remarkable and apparently meaningless manner in which the nerves arose and were distributed. He laid hold of a basal fact: he realised that if he could discover the uses of the various parts of the nervous system he could explain the complexity of their arrangement. His merit lies, not in making a reasonable guess as to the function of cerebrum, cerebellum, double nerve roots and double nerve supply, but in having made this guess from his knowledge of human anatomy, he proceeded to test its truth on the bodies of other animals by dissection, and above all by experiment. His reputation as a discoverer does not rest on a quibble as to who discovered the exact function of the nerve roots, but on the fact that he was the first man that realised that the anatomy of our brain and nerves could be explained. In 1841 he could see that the movement which he had initiated had extended to Paris, to Berlin, London, and Edinburgh. The investigation which John Reid had carried out in 1838 on the function of the 9th, 10th, 11th cranial nerves,* and the research on the same nerves which James Spence† had then on hand, were direct results of Bell's work. His simple conception of the origin of man assisted him in his researches. He was a convinced and devout follower of Paley, regarding the human body as a special creation of marvellous design, and believing that the working of its parts could be discovered by studying their arrangement. In brief, he was a teleologist.

ROBERT KNOX.

Knox's services to anatomy were of a very different nature. During the sixteen years he earned a livelihood by teaching anatomy in Surgeons' Square he carried out many and valuable researches in human and comparative anatomy. Modern and fresh as these still are, it is not because of them that we remember him, but because he was the chief agent by which a revolution was effected in the minds of Scottish anatomists concerning the nature of the human body. So potent was Knox's influence on the history of anatomy in Scotland that we must look for a minute at a critical phase in his life. In 1822, when he had retired from the Army Medical Service and was in his

* *Edin. Med. and Surg. Journ.*, 1838, vol. xlix. p. 109, "Experimental Investigation into the Functions of the 8th Pair of Nerves, etc.," by J. Reid, M.D., Lecturer on the Institutes of Medicine, formerly Demonstrator of Anatomy.

† *Edin. Med. and Surg. Journ.*, 1842, vol. lviii. p. 397.

31st year, he paid a visit to Paris, and found Cuvier and Geoffroy St. Hilaire in the full tide of their fame. When he returned to Edinburgh his Covenanter's soul glowed with the ideals and discoveries of the great Frenchmen. He now viewed the human body, not as a special creation, but as part of that great plan in which Nature had fashioned all vertebrate animals, past and present. Those phrases with which we are now so familiar came into use—"rudimentary structures," "arrested development," "recapitulation by the embryo of ancestral stages," and "homologous structures." The anatomist's ideals were changed. It was no longer his aim to discover the functional significance of parts, but to ascertain the plan on which the body was formed and the type from which its individual parts had been evolved. Knox was only the apostle, not the originator, of this doctrine. His master, the lovable Dr. Barclay, had paved the way for him, and everyone knows how Owen developed morphology afterwards in England. Knox jeered at the "special creationists" when orthodoxy was really strict in Scotland; he scoffed at the "coarse utilitarianism of Paley, by which Sir Charles Bell stood;" he flouted those who regarded "anatomy as an appendage of surgery." He declared there was no real school of anatomy except in France, that there had been no great anatomist in London except John Hunter, and he invariably spoke as if there were none in Edinburgh except himself. He was a century before his time, and had to pay the price of his genius and his failings. By 1841, when he had passed his 50th year, he found he had outstayed his welcome in Edinburgh. He became the King Lear of anatomists; but we shall see that his influence remained behind him and bore fruit for many generations after he had gone.

ALEXANDER MONRO (TERTIUS).

We must turn for a minute to Alexander Monro, who held the Chair of Anatomy in the University during the time John Struthers was a student. Indeed Struthers himself had commenced to teach anatomy when, in 1846, Monro resigned at the age of 72, after having taught anatomy in the University for 48 years. If we accept the verdict of his contemporaries, that he was an incompetent teacher and that his dulness was the virtue which gave Edinburgh the great extra-mural school of Barclay and Knox, we shall show but a meagre understanding of either the man himself or of the events which were shaping

then in anatomy. The truth is, he had outlived his period. He had ideals. From the numerous researches and books which he published we can see that he studied the anatomy of the human body with two objects: (1) in order that surgeons might operate on it with dexterity; (2) to note the disturbances caused in it by disease, so far as these could be brought to light by knife and forceps. These were the ideals which Allan Burns of Glasgow and Matthew Baillie of London had made popular in Monro's more youthful days. It was not because of his ideals he failed, it was because he was content to play the local tunes of his younger days while Knox was setting the youth of Edinburgh agog with a music which was then thrilling Europe. He failed in the first duty of a professor, the duty of bringing students in touch with the best movements of the time.

THE YOUNGER ANATOMISTS.

Having thus summarily dismissed the three senior men who were directing the destinies of anatomy in Scotland at the beginning of Struthers' career, we come face to face with one of the most wonderful groups of young investigators ever produced by Edinburgh, or by any other capital of Europe. Only three of them come directly into this history—Allen Thomson, Hughes Bennett, and John Goodsir; the other members of the group were—John Reid, James Y. Simpson, William Sharpey, T. Wharton Jones, Harry Goodsir, Hugh Falconer, Edward Forbes, Martin Barry, and W. B. Carpenter. Each of these played a part, directly or indirectly, in forwarding our knowledge of the human body. With one exception—Allen Thomson, a son of the Professoriate—they were pupils of Knox. It would take us too far afield to trace the sources of their inspiration; it is enough to note that through Edinburgh they took, not a local but a cosmopolitan position amongst the pioneers of their time. Wm. Sharpey, who passed as an anatomist in Edinburgh, founded the School of Physiology at University College, London. Amongst those whom he influenced were Michael Foster and Burdon Sander-son, the founders of the Physiological Schools at Cambridge and at Oxford Universities: the distinguished occupant of the Chair of Physiology of this University, Professor Schaefer, is also a pupil of his. Wharton Jones set Huxley out on his great career, and one has only to turn to the brilliant researches which Lord Lister carried out in his youthful days to see how directly Wharton Jones was his godfather in science.

RESEARCHES OF THE YOUNGER ANATOMISTS—EMBRYOLOGY.

We now proceed to see the form which anatomy is to take in the hands of the younger men. In the autumn of 1841 Allen Thomson * was earning his living by teaching anatomy to students at No. 1 Surgeons' Square. John Struthers attended his class. He had just exchanged places with Alexander Lizars, Thomson returning to Edinburgh and Lizars going to Aberdeen. He was the first in Scotland to apply himself to the study of the early stages in the development of the human embryo. When he graduated in 1830, at the age of 21, he read an account of his observation on the formation of blood-vessels in the mammalian embryo as his thesis for the degree of Doctor of Medicine. The microscope had then reached a degree of proficiency—thanks in no small measure to the inventive genius of Joseph J. Lister, the father of Lord Lister—thus making it possible to investigate the finer anatomy of embryos. After graduation, as was the habit of the more brilliant students, he visited the Continent, and made himself familiar with the men and movements in Paris and in the rising schools of Germany. In 1824 Rathke of Dantzic had noted the gill clefts in the embryo of the sheep; in the same year Parkinje of Breslau had discovered the ovum of the bird: two years later von Baer found the ovum of the dog. Allen Thomson appeared at a time when the history of the embryo was occupying the attention of anatomists on the Continent; he domiciled that movement in Scotland. In 1839 his most important paper appeared in the pages of the *Edinburgh Medical and Surgical Journal*.† It is a description of two very early stages in the development of the human embryo. One of these embryos he had obtained from his friend, John Reid. Little was then known of these very early stages. The only men who had already seen and described equally young specimens were his Edinburgh contemporary, Wharton Jones, and young Coste of Paris. Forty years later, when Professor His of Leipzig commenced to systematise our knowledge of the early stages in the development of the human body, he found Allen Thomson's records amongst the few which had an abiding value. Allen Thomson was not the only one of the young Edinburgh group who had studied abroad and joined in the embryological movement. Mention has been made of

* Obituary Notice by Sir John Struthers, *Edin. Med. Journ.*, 1884, vol. xxix. p. 1151; Obituary Notice by Professor M'Kendrick, *Proc. Roy. Soc. Lond.*, 1884, p. 24.

† Vol. lii. p. 119.

Wharton Jones: there was a third, perhaps the greatest of the three, Dr. Martin Barry.* It was he who first recognised the spermatozoa within the mammalian ovum and noted the first changes which follow fertilisation. He was an excellent observer, and had that quality of imagination which interprets rightly the significance of things seen. Although three years junior to Thomson as a graduate he was the older man, being at the time of which we write (1841) already in his 39th year. His earlier work was done in Edinburgh, but seeing no sign of obtaining a permanent position there, he set out to find one in 1842, but his search was vain; there was no demand for embryologists in this country at that period. Like Francis M. Balfour, brother of the ex-Premier and the greatest British embryologist of last century, he was a noted Alpinist.

THE MICROSCOPE—DR. HUGHES BENNETT.†

At the beginning of the winter session of 1841-42 another movement was initiated by Dr. Hughes Bennett in Surgeons' Square. After a sojourn of four years on the Continent he returned at the age of 29 to open a private class for the instruction of medical students in the use of the microscope. Hughes Bennett did not introduce that instrument to Edinburgh—it had been in the hands of those carrying out special investigations for more than 10 years. His pioneership lies in the fact that he was the first in Scotland to realise that it was a powerful instrument for medical research, and essential for a real understanding of the structure of the body in health and in disease. Again we are dealing with the expansion of a continental movement, with its chief centre in the Anatomical Department of the University of Berlin. Johannes Müller, the Professor of Anatomy, was then (1841) a man of 40, with a group of young assistants round him—Henle, Koelliker, Remak, Brücke; among his students were Virchow, Helmholtz, and Du Bois Raymond. His assistant was Schwann; his colleague was Schleiden the botanist. Discoveries in the finer structure of the body were of daily occurrence; tissues and organs which to the naked eye seemed uniform material were resolved by the microscope into their structural elements.

* See Sir William Turner's "Cell Theory, Past and Present," *Journ. Anat. and Physiol.*, 1889, vol. xxiv. p. 253.

† See Professor Mc'Kendrick's account of his life and work, *Edin. Med. Journ.*, 1871, vol. xxi. p. 466.

The immediate cause of the burst of enthusiasm in 1841 was the announcement made by Schleiden and Schwann two years previously, namely, that plants and animals were composed of microscopic units or cells. It was Schwann that unfurled the flag, but it was Johannes Müller that planned the campaign which led to the capture of the position. The real pioneer, however, was William Hewson, who taught anatomy in London with William Hunter in the latter part of the 18th century. Is it not a curious fact that we see Allen Thomson and Hughes Bennett about the end of the fourth decade of the 19th century introducing from Germany movements which were really initiated at a much earlier date in England? For if we count Hewson the pioneer as an anatomical microscopist, we cannot withhold the claims of William Harvey as the pioneer of embryology.

We shall leave Hughes Bennett to teach his class and apply his microscope to the inflammatory changes in the brain, and turn to see what John Goodsir, the young conservator of the College of Surgeons, was doing in 1841.

JOHN GOODSIR.

The heart warms to John Goodsir in spite of his tall, sombre appearance and his Calvinistic spirit. He has not been abroad, like the other members of the youthful Edinburgh group, to seek for inspiration, but has found it in his native Firth of Forth with his own eye and with his own brain. As a boy he studied the marine invertebrates of the Firth; they are the animal forms which take the inquirer nearest to the secrets of life. At the very beginning of his student's career in 1831 we find him amongst the subjects laid out in Knox's dissecting-room, instructing Edward Forbes, newly arrived from the Isle of Man, in the anatomy of the Mollusca. They go dredging in the Firth together, then and often afterwards preparing the way for the great "Challenger Expedition," which was to set out under Sir Wyville Thomson 40 years later. Through Knox and by his own reading he learnt what was on foot in the medical centres of France and Germany. His apprenticeship as a dentist—under Nasmyth, one of the best dental anatomists of the time—ended in a research in which he described fully and accurately the various stages in the development of the human teeth, and in which he recognised that the pulp round which the tooth is formed is in reality a submerged dermal papilla. He found later that Arnold of Heidelberg had

anticipated most of his discoveries in 1831. So, too, in 1841, when he had unravelled the anatomy of amphioxus, and determined its intermediate position in the animal kingdom, he found Johannes Müller and Rathke had been making similar researches with corresponding results. It was with a basal training of this nature, a training which involved the study of the simpler forms of life under the microscope, that John Goodsir approached the study of the human body. As conservator in the museum of this college he was brought in contact with the preparation of Barclay's collection, but more especially with the specimens from the museum of Sir Charles Bell, which this college had boldly acquired in 1824. Amongst them were the preparations which William Cruickshank had preserved to illustrate the mouths of absorbent vessels in the villi of the intestine. Goodsir applied his microscope and found that the vessels ended blindly; he observed a carpet of cells between the absorbent vessels and the contents of the intestine, and he concluded that it must be these cells which extract nourishment from the food. John Hunter regarded the smaller vessels as the parts which absorbed bone; William Cruickshank believed he had demonstrated that the lacteals absorbed nourishment from the intestine; it was John Goodsir who discovered that the cells were the real structures concerned in absorption and in excretion. There again he was forestalled by Purkinje of Breslau. It is not priority that should count when we come to estimate a man; it is the accuracy of his observations and the justice of his inference, and in both of these the process of time has shown that Goodsir was pre-eminent. It is not necessary here to follow his investigations in the microscopic structure of the kidneys in health and in disease, his recognition of the nucleus as the centre of a cell's reproductive power, his identification of *sarcinae* as a cause of vomiting, and their destruction by the use of creosote. The lesson we may learn from his early career is that the secrets of man's body will not yield to a frontal attack with knife and forceps, as was Monro's method. Those secrets will yield only to those who approach man's anatomy through those simple animal forms where the processes of life are more easily observed.

THE POSITION OF ANATOMY IN 1846.

We pass on to the year 1846. Monro at last had resigned, and Goodsir had succeeded him as Professor of Anatomy in the

University. Dr. Struthers* was by then a fellow of this college and conservator of the museum, having succeeded in that post Harry Goodsir, who perished in Sir John Franklin's expedition. He was then in partnership with Handyside in an extra-mural school of anatomy. It was realised that the appointment of Goodsir presaged a hard time for the extra-mural teachers of anatomy, and so it fell out. The event of the year which most concerns us here is Goodsir's inaugural address. He surveyed with a masterly eye the whole horizon of anatomy and the various periods of anatomical progress, but when he came to his own period—the period which begins with the introduction of the microscope in 1830—he hesitated and confessed that the direction of future progress was obscure. We of a later generation know that movements were at that date already on foot which materially altered the course of anatomy. In 1841 Darwin had settled at Downe, and the first draft of his theory of the origin of species was written in the same year (1841). Robert Chambers, a citizen of Edinburgh, was in retirement at St. Andrews. In the course of supplying useful information for the people he had become aware that the discoveries of Lyell, of Agassiz, of Knox, and of the French School were at variance with the Mosaic account of creation. He spent two years trying to reconcile the conflicting accounts, the result being the *Vestiges of Creation*, published in 1844. It is not necessary to remind my hearers that Hugh Miller was then in Edinburgh. He had familiarised the people

* Sir John Struthers had a successful student's career. In his first year 1841-42 he was first prizeman in Dr. Allen Thomson's anatomy class; in 1842-43 he was again first prizeman in anatomy (Handyside, Spence, and Lonsdale's school), and first in physiology in the University (Professor Allen Thomson); also first prizeman in botany (Professor Graham). In 1843-44 he gained the prize for the best dissection at the extra-mural school; first prize in surgery (Professor Miller); first prize (University) for an essay on "The Movements of the Eyeball in Man, and on Strabismus;" 1844-45, first prize in pathology (Professor Henderson). The great educational value of student societies is seen in his career. In 1843 he joined the Hunterian Medical Society, founded or resuscitated by Knox and Lonsdale about 1840; Andrew Clark and William Gairdner joined in the same year. His elder brother, James, afterwards the physician of Leith, was elected a member in 1845, and his younger brother, Alexander, who died in the Crimea, joined in 1847, but soon after resigned and joined the Royal Medical Society. Sir John Struthers and Sir William Gairdner became the moving spirits of the Hunterian Society. Sir John Struthers read papers on "Amputation at the Knee and Ankle Joints" (1845); on "Homoeopathy" and on "Tracheotomy" (1846); "Phrenology"; "Sulphuric Ether"; "Cell-Development" (1847). The Society became defunct about 1857.—(MS. notes by Sir John Struthers.)

of Scotland with curious worlds of past life which lay buried in the rocks. We see on foot in Edinburgh a movement affecting even the non-professional public which was destined to influence the anatomist, in so far as it completely altered the accepted account of man's origin.

POSITION OF ANATOMY IN 1863.

We now pass forwards to 1863. That year is chosen because it marks the close of Dr. Struthers's career as an extra-mural teacher of anatomy in Edinburgh, and for the further reason that it provides an excellent opportunity of seeing how the anatomists of Scotland were affected by the *Origin of Species*, which had appeared four years previously. Research in anatomy had by this time spread beyond the bounds of Edinburgh. Allen Thomson held the Chair of Anatomy in Glasgow, having in 1848 given up the Chair of Physiology in this University, which he had occupied for six years; his successor was Dr. Hughes Bennett. His early career promised a front position among the embryologists of Europe, but while his German confrères pressed forwards to discover the secrets of embryonic development, he was content to carry out minor researches and take a leading part in establishing the two great standard works of British Anatomy—*Todd's Cyclopædia* and *Quain's Anatomy*. No school of embryologists arose in Scotland in his time; unfortunately with all his splendid natural endowments he lacked that magnetism which turns pupils into disciples and apostles. John Reid,* the most promising representative of the younger Edinburgh school, died at St. Andrews in 1849, after having held the chair there for eight years. With his premature death—he was only in his fortieth year—the school of Sir Charles Bell—of the Monroes and of the Hunters—the School of Experimental Anatomists—came to an end. In 1850, while holding the Chair of Anatomy at King's College, Aberdeen, Professor Peter Redfern published his classical paper on the microscopic structure of the cartilage of joints in health and disease. The author of that paper is now the Senior Fellow of the Royal College of Surgeons, England, the next in order of seniority being Lord Lister, and is the sole surviving member of that wonderful group of young microscopists—Bowman, Paget,

* *Life of Dr. John Reid*, by G. Wilson, 1852; *Physiological, Anatomical and Pathological Essays*, Edinburgh, 1848. See also account of his life and work by Professor D. Fraser Harris, *Nature*, 5th August 1909, p. 165.

Busk, Gulliver, Quekett and Simon—who studied and worked in London in the early “forties” of last century. In Edinburgh, with Goodsir at the height of his name and fame, matters in the anatomical world had become simplified. Dr. Struthers, as Lecturer on Anatomy at Surgeons’ Hall, was the sole representative of the band of extra-mural anatomists who thrived in Edinburgh so long as Monro held the chair. Let us see how anatomy prospered between 1846 and 1863 under Goodsir and Struthers.

THE NATURE OF THE EARLY RESEARCHES OF SIR JOHN STRUTHERS.*

The direction of a young anatomist’s research is influenced by the traditions and movements of his time, and to this law John Struthers was not an exception. In 1840 Dieffenbach introduced his operation for squint, which quickly became popular in Europe; in 1841 his teacher of physiology, Professor Alison, published an explanation of why the muscles of the eyeball were supplied with sensory as well as with motor nerves. Hence we find Dr. Struthers’s researches are concerned with the muscles and nerves of the eye and with squint. As a student of anatomy in the extra-mural school of Handyside, Spence, and Lonsdale we find him investigating the nerves and muscles of the eye. In 1845, 1849, and 1852 he published papers on the action of the orbital muscles and on the nature of their nerve supply. In these early papers his endeavours are directed to throw light on the normal action of the parts and their disturbances in disease.

The efficacy of blood-letting was being discussed in the early days of his professional career. We find him investigating how it is possible, or rather impossible, to relieve congestion of the abdominal viscera by drawing blood from the body-wall surround-

* I possess a volume of Sir John Struthers’s collected papers from 1845-1889. It was given to me by my friend, Dr. William Bulloch. It contains (1) “Memoir on the Clavicle” (Edinburgh, 1855), the first of a series of osteological memoirs—the only one published. (2) “Anatomical and Physiological Observations” (Part I.), Edinburgh, 1854 (16 papers are included, most of which appeared in the *Edin. Med. Journ.*). (3) “Anatomical and Physiological Observations” (Part II.), Aberdeen, 1864 (6 papers are included). (4) “References to Papers in Anatomy—Human and Comparative,” Edinburgh, 1889 (summaries are given of 70 of his published researches). Subsequently to 1889 most of his papers appeared in the *Journal of Anatomy and Physiology* and the *Edinburgh Medical Journal*. His Presidential Address to the Royal Physical Society on “Rudimentary Structures” was published in the *Proceedings* of that Society for 1898.

ing them.* He examined the arrangement of the valves of the jugular veins to see how far blood-letting could relieve distension of the heart in cases of suffocation—a subject which had received the attention of John Reid a few years previously. Although his aim was to use anatomy as a stepping-stone to surgery—and he became assistant surgeon to the Infirmary in 1854—he was at heart an anatomist. Just before he commenced his studies two works appeared—Ward's book on *Osteology* (1838) and Ellis's *Manual of Dissections* (1840)—which had a powerful influence on British anatomists. The authors of these works proceeded on the principle that the business of an anatomist was to give a minute and accurate description of the bones and of the soft parts of the human body, and when they had done that their task was finished. It must be admitted they were successful in their aim; they described the human body in detail and with extreme accuracy. They had a whole-hearted disciple in the young extra-mural lecturer of Edinburgh. In his "Memoir on the Clavicle," published in 1855, we see this ideal being carried into practice—an ideal absolutely at variance with the conception of the Bell school. We can also see that he was influenced by the French school, by Knox, and by Barclay. He became the owner of Knox's specimens, and as conservator of the museum of this college knew Barclay's collection well. The significance of vestigial or rudimentary structures fascinated him from the very beginning of his career. That curious little hook of bone which occasionally occurs on the inner side of the humerus above the elbow joint—the supracondyloid process—had been recognised by Knox in 1841 as the reappearance in man of a structure that occurred constantly in many animals. All through his life Struthers made observations on this process, issuing them as papers in 1848, 1854, 1858, and 1881. His specimens are in the museum of this college to speak for themselves. His inquiry opened out for him not only a series of new observations on the anatomy of the human arm, but he also realised that in this small and apparently insignificant thing much of the past history of man might be revealed. We know very well what he thought of the origin of man in 1857, when he gave a lecture in this college on "The Unity of Organisation." At that time, in common with the leading men of this period, he regarded the human body as a creation, fashioned after the plan which had served as a type or design for higher animals. In man's body some

* See Sir William Turner's observations to the opposite effect: *Brit. and Foreign Med. Chir. Rev.*, July 1863.



Photolithograph.

PORTRAIT OF SIR JOHN STRUTHERS IN 1850 (ÆT. 27). ,

structures were specially developed, and others had become reduced to vestiges. In 1863 we see that his outlook on the animal kingdom and the nature of his researches were changed; he had joined the unpopular Darwinian movement. He now became a student of variation and of heredity. The studies he then made of families possessing extra fingers and toes, or showing abnormal union and other anomalies of the digits, not only afforded evidence in support of Darwin's theories, but constitute permanent contributions to the natural history of mankind.*

We see here another instance of the truth that revolutions in anatomy arise outside the dissecting-room. In this case Darwin the naturalist was the active agent. The "Unity of Organisation" movement came from the biologists Cuvier and Geoffroy St. Hilaire; the doctrine of design from Paley the theologian. At the very date of which we write a French chemist was changing the outlook of all medical men.

THE LATER RESEARCHES OF GOODSIR.

In 1863 Goodsir had held the chair for 17 years, and there were already signs of the unfortunate illness which, four years later, at the age of 53, was to put an end to a life of vigorous and feverish research. He pursued the secrets of life in manifold directions: on the fauna of his beloved Firth, on electrical organs of fishes, on the development and nature of the glands of internal secretion, and on the mechanics of the human body. Above all he was drawn into the search for the underlying plan or type on which the animal body had been created. In the early years of Goodsir's professoriate Richard Owen was popularising the idea that the skull was made up of a series of fused vertebrae. The theory

All through life Sir John Struthers kept his mind fresh and open. At a dinner given by the Aberdeen students to Huxley in 1874, after they had made him their Lord Rector, Professor Struthers said: "There is scarcely a thing which I believed in 25 years ago which I believe in now, and in another 25 years I expect it will be also so." Mrs. Niecks, his daughter, has in her possession some interesting letters which passed between Huxley and Sir John Struthers. The latter, Professor Struthers as he then was—he received the honour of knighthood in 1898—had urged the Students' Committee to select Huxley as a candidate, and also pleaded with Huxley to stand. The latter was unwilling on account of health. Huxley then suffered from dyspepsia, with, as he said, "eupeptic intervals." Professor Struthers, who suffered in a similar manner from 1870 onwards, pictured the north of Scotland as suffering from "the old worship of Greek and Latin." He wanted Huxley to help Bain and himself in giving science subjects a better standing in the University of Aberdeen.

has been much discussed since then. Goodsir was the first to show that the key to the problem was to be found in the segmentation of the embryonic head and in the distribution of the cranial nerves. At first sight his researches seem a long way off from applied human anatomy, yet one has only to consider the modern work of Gaskell, of Sherrington, and of Head to see that the time is coming when Goodsir's researches will serve as a basis for clinical practice. When the Darwinian movement commenced, Goodsir, the stern Calvinist, as was also the case with Owen, stiffened his back; he strove to rescue man from the hands of the evolutionists. The lectures on "The Dignity of the Human Body," which he delivered to his class in 1862 as a counterblast to Huxley's lecture in Edinburgh on "The Zoological Position of Man," constitute one of the most searching analyses ever made of the peculiar features of the human body. He went to his end with the anti-evolution flag still flying.

LISTER AND TURNER ARRIVE.

We have seen that at an early date Edinburgh conferred two of her best men on London—Sharpey and Wharton Jones. In 1854 London repaid her debt with interest; she sent Lister and Turner. William Turner, a young man of 24, a favourite pupil of Sir James Paget at St. Bartholomew's Hospital, came in that year to act as Demonstrator of Anatomy in the University, and to carry on the class of microscopic anatomy. His first love was chemistry. Before his arrival in Edinburgh he had already discovered that the reducing substance in cerebro-spinal fluid was not sugar but some other substance.* Lister had arrived two years before him to visit Syme. When Turner arrived in Edinburgh we find Lister studying living anatomy in the frog's web—the shape and action of the muscle fibres of the arterioles, the pigment cells with their mysterious movements of granules—and the minute anatomy of the lacteals in the mesentery of the mouse. Presently we find Lister and Turner collaborating in a research on the anatomy of nerve fibres. They employed a carmine stain to differentiate the axis cylinders of nerve fibres from their sheaths; by this we see that anatomists were beginning to employ microscopic chemistry to help

* During the present year Sir William Turner conferred a boon on all students of medicine by publishing a list of his researches (from 1854-1910). The list contains the titles of 268 papers: (1) Human Anatomy and Physiology; (2) Comparative Anatomy and Geology; (3) Pathological Anatomy; (4) Anthropology; (5) General Addresses and Reviews; (6) In Memoriam Notices.

them in differentiating the elementary tissues of the body. Even at this early date Turner manifests a catholicity of taste in his research work. We find him investigating the results of obstruction of the thoracic duct, the condition produced by adhesion of the palate to the pharynx, the elimination of manganese from the body, cellular pathology, inflammatory changes in the peritoneum, and the microscopic anatomy and functions of the pancreas. The influence of Goodsir becomes apparent: Turner, too, falls a victim to the fauna of the beloved Firth. He becomes morphologist, and investigates the arch of the aorta and the nature of its aberrant branches. When the Darwinian movement broke out he took a leading part in the discussions of the time - the recent discoveries of fossil man, the characteristic features of the human brain, the laws which determine the shape of the human skull.

Goodsir had that power which marks the master—the power of attracting and influencing young, able men. Soon after Goodsir assumed the chair his demonstrator, Mr. C. H. Hallett, began to record systematically the deviations from the normal found during dissection of the human body. At that time such variations were regarded as meaningless, but Goodsir knew better. On no pupil was his influence stronger than on John Cleland, who became his demonstrator in 1857. He also worked at the fauna of the Firth, but his chief energies were given to furthering those problems at which Owen and Goodsir had worked concerning the morphological nature of the human skull and skeleton. In 1861 he went to assist Allen Thomson in Glasgow, in 1863 to Galway. The researches of James Bell Pettigrew,* who was a fellow demonstrator with Cleland, are marked by his own strong individuality. Beginning by an investigation of the nerve supply of the heart, he utilised his wonderful manipulative skill to unravel the complex musculature of the heart and other muscular viscera. Goodsir had no more devout pupil and demonstrator than John Chiene, Emeritus Professor of Surgery in this University. He turned his attention to surgical anatomy, and in one of his earliest papers he recognised and described accurately the condition now known as retro-peritoneal hernia. Sir William Mitchell Banks was another of the distinguished anatomical pupils of Goodsir.

* From 1862 to 1868 he was assistant to Sir William Flower in the Museum of the Royal College of Surgeons, England. He added many preparations of great value to the museum, and left behind him a skilled pupil in William Pearson, the present prosector to the college.

CHANGE IN THE ANATOMICAL POINT OF VIEW.

By 1863 the anatomists in Scotland had become interested in the form of structures rather than in their function—they were searching for the basal plans on which the human body was constructed. The Darwinian movement again altered their point of view. They then began to search for the origin and evolution of structure. No doubt the neglect of function was due in some degree to the technical separation of anatomy from physiology which began with the 19th century, although in the University of Edinburgh they had been separated at a much earlier date (1726).

ANATOMY IN SCOTLAND AT THE END OF THE 19TH CENTURY.

When we come to survey Scotland at the close of Sir John Struthers's life we see how amazingly the study of the human body has prospered. Edinburgh still held the pride of place, but Glasgow, Aberdeen, St. Andrews, and Dundee had also become centres of anatomical research. When in 1889, after 26 years of strenuous life, Sir John Struthers withdrew to Edinburgh to renew his early associations and his youth he had established in the University of Aberdeen a fully-equipped school of anatomy, and inspired a band of young anatomists. The most distinguished of these, Professor R. W. Reid, became his successor. Professor Wardrop Griffith was promoted to the Chair of Anatomy in Leeds, while in Sir John's later days Dr. Reginald Gladstone and the present lecturer had gained a footing in the anatomical schools of London. In 1877 Allen Thomson retired, and was succeeded in the chair at Glasgow by Professor John Cleland. By the end of the century it was very apparent that the inspiration and the methods of John Goodsir had prospered exceedingly in Glasgow, not only in Professor Cleland's own hands but also in those of his pupils, amongst whom were Professor Alexander Fraser of Dublin, Principal Mackay of Dundee, Dr. Bruce Young, Dr. James Hutton, Dr. James Gemmill, and Dr. Alex. Macphail.

Professor Bell Pettigrew held Reid's chair at St. Andrews, to which he was appointed in 1875. Seven years before going to St. Andrews he held the conservatorship of the museum of this college. He was a devout pupil of Goodsir's, as may be seen from the three volumes of his works, *Design in Nature*, published just after his death in 1908.



PORTRAIT OF SIR JOHN STRUTHERS .ÆT. 62.

ANATOMY IN EDINBURGH DURING SIR WILLIAM TURNER'S
PROFESSORIALTE.

In Edinburgh the University and extra-mural schools continued in their prosperity. When the founder of this lecture left Edinburgh in 1863 his old master, Dr. Peter D. Handyside, again took up anatomy and succeeded him at the School of Medicine, and continued to teach and research until his death in 1881, when, as we shall see, the anatomical staff of the extra-mural schools was recruited from the University. In 1867 John Goodsir died at the age of 53, and at the age of 35 William Turner succeeded him. The young professor took his place at once amongst the first anatomists of Europe, not by reason of the prestige of his chair, but by the right use of the great gifts Nature had bestowed on him. In the first year of his professorialte he rendered British anatomists an invaluable service by taking a leading part in founding and maintaining the *Journal of Anatomy and Physiology*. In the early numbers one can see how hard he must have worked and thought, how closely he followed the movements in continental schools, and how well he kept British anatomists informed of the most recent discoveries made abroad. By the end of the century he had become the father of the largest family of anatomists the world has ever seen. In 1874 his senior demonstrator, Morrison Watson, went to fill the Chair of Anatomy at Manchester, James Russell* succeeded to the senior demonstratorship, and room was thus made for the greatest of all Sir William Turner's pupils, Daniel John Cunningham—a man framed in Nature's most liberal mood. Amongst Cunningham's many gifts was that of exposition, which, when he had gone to Dublin in 1882, he employed most happily in systematising the teaching and traditions of the Edinburgh School of Anatomy. Professor Cossar Ewart was a fellow demonstrator with Cunningham; in 1876 Alfred H. Young went to assist and to succeed Professor Morrison Watson; Johnson Symington, after demonstrating at the University (1877-1880), became the first lecturer of anatomy at Minto House,† and continued to teach and research in the extra-mural school until he went to Belfast in 1894. I will content myself by merely naming the succession of pupils and demonstrators who took up the study of anatomy during the last two decades of the century. Arthur

* Sir James A. Russell, Inspector of Anatomy for Scotland.

† Minto House. Note by Dr. Whitaker.

Thomson (to Oxford, 1885); David Hepburn (to Cardiff, 1903); A. M. Paterson (to Dundee, 1888, to Liverpool, 1894); Arthur Robinson (to Manchester, 1885); James T. Wilson (to Sydney, 1885); Robert Howden (to Newcastle, 1889); Th. H. Bryce (to Queen Margaret's College, Glasgow, 1890); A. W. Hughes (to Cardiff, 1893); James Musgrove (to St. Andrews, 1897); Edward Fawcett (to Bristol, 1894); R. J. A. Berry (to Melbourne, 1906); David Waterston (to King's College, London, 1909); and Professor Charnock Bradley. Many of these taught in the extra-mural school before leaving Edinburgh. C. R. Whitaker, the present lecturer in the School of Medicine, a pupil of the extra-mural school, commenced to teach in 1894. Amongst the extra-mural lecturers I must not omit the names of three men who, although not professional anatomists, yet contributed to the literature of anatomy—Mr. C. W. Cathcart,* Professor F. M. Caird, and Dr. Macdonald Brown.

THE NATURE OF ANATOMICAL RESEARCH IN THE LATER DECADES OF THE 19TH CENTURY.

In the last three decades of the 19th century we see the straggling band of Scottish anatomists becoming a disciplined army, and we will now direct our attention to the manner in which they were seeking to extend our knowledge of the human body. Although Allen Thomson introduced at an early date the study of human development, yet embryological research never really thrived in Scotland; we took only a small share in securing the harvest of knowledge available at the end of the 19th century. The present distinguished occupant of the Chair of Anatomy in this University was the only one of the younger anatomists who devoted himself to research on the embryo; the valuable inquiries of Dr. John Beard were carried out in Edinburgh, and those of Professor Charnock Bradley belong to a later date. It was not until the next century opened that the German methods of investigation and of reconstruction were introduced, when we see them being applied with excellent effect by Dr. Alex. Low of Aberdeen. Amongst his many subjects of research Professor Cleland included the conditions which arise from disturbances during the development of the embryo, and his pupil, Dr. James Gemmill, is the only one in Scotland who took up the experimental study of the embryo; yet on the Continent and in America

* Mr. Cathcart succeeded Dr. Handyside in 1881.

this method of research has been used with excellent results for thirty years. It was *during* this period that Dr. Ballantyne produced his standard work on the deformities which arise in the human body during development; at a later date Professor Bryce and Dr. Teacher described one of the earliest stages yet seen in the development of the human embryo.

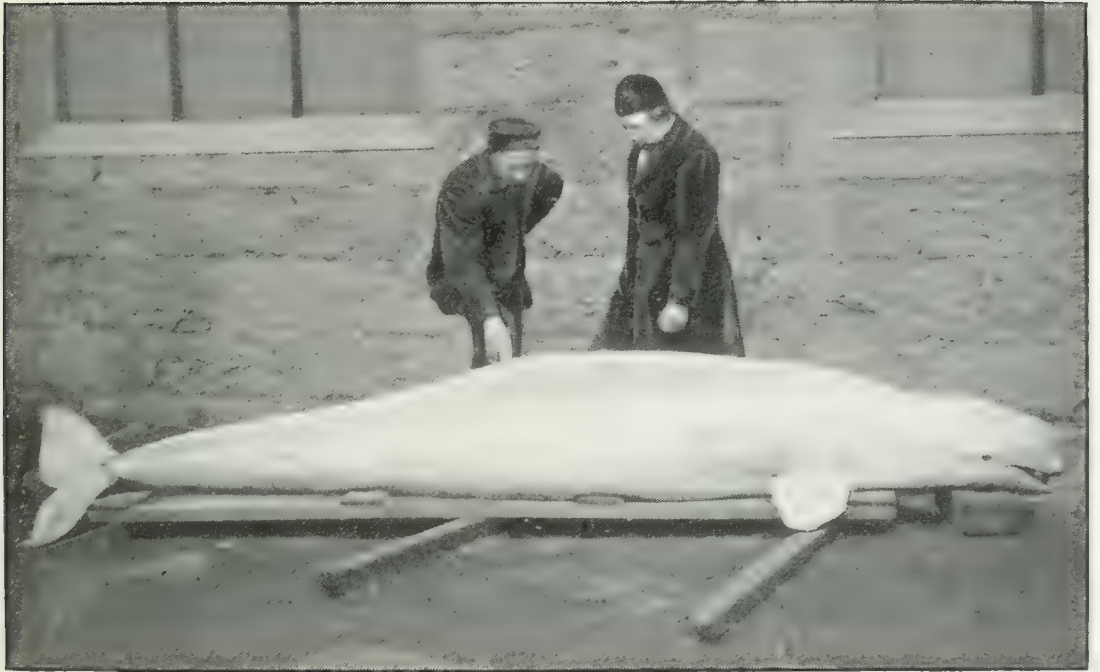
It was in the time of Sir John Struthers that we became acquainted with the microscopical structure of the human body, but the share taken by the Scottish anatomists in this work was a minor one. This is the more strange when we remember that Goodsir and Hughes Bennett were pioneers in this work. In his early research work on the pancreas, nerve fibres, tumours, and especially during his investigation of the placenta, we see that Turner was an expert microscopist. The modern method of preparing tissues for microscopic examination, of cutting sections and staining them, was employed in Scotland at an early date. In some directions we were pioneers. In 1869 Mr. A. B. Stirling, museum assistant under Goodsir and Turner, invented an instrument for cutting tissues into fine sections for microscopical examinations; in 1882 Mr. Cathcart introduced his ether freezing section cutter; and in 1883 Dr. Caldwell, an Edinburgh graduate, invented an automatic microtome (Cambridge Rocker). During the later decades of the century students were taught how to examine the tissue of the body with the microscope both in the anatomical and in the physiological departments of all the Scottish universities, and yet no expert of the first rank was produced in this department of research. The early work of my old teacher, Professor William Stirling, shows that if other forms of research had not called him he could have taken that rank.

THE INFLUENCE OF KNOX, GOODSIR, AND DARWIN.

The direction which research took amongst the anatomists of Scotland during the last four decades of the 19th century was determined by the ideals and traditions of Knox and of Goodsir, moulded and tempered by the discoveries of Darwin. Anatomists set out, as Knox and Goodsir had done, to discover that larger kingdom of which man was a part. They followed Darwin in seeking to trace his past history by the aid of comparative anatomy; they realised that the only sure foundation for human anatomy was a wide study of all forms of life. Let me take two typical examples from the work of Sir William Turner. In 1872

doubts were again raised as to the structure of the human placenta. He first verified, as John Reid and Goodsir had done, that the Hunterian discovery was right: in the previous year he had examined the placenta of a whale (*Orca gladiator*). During the subsequent 18 years he availed himself of every opportunity to study the placenta in all classes of mammals. He found, as he expected from Darwin's teaching, that various stages in the evolution of the placenta were still to be seen in modern mammals, and that the human placenta represented only one of the types which had been evolved. Later Hubrecht discovered the trophoblast, and Selenka showed that, as far as concerns the placenta, man and anthropoid were the same. During that period he was also studying the brain in the same manner. He—as was the case with all the anatomists in Scotland—developed a passion for observing and recording every fact which could directly or indirectly throw light on the laws which determine animal form. Now of all the experiments which Nature ever made in adaptation and in change of form, none are more wonderful than the examples to be seen in the anatomy of whales—land mammals which have come to live a fish-like life. At the beginning of the century Geoffroy St. Hilaire found the rudiments of teeth under the whale-bone plates; Knox made whales a subject of study; Goodsir had his eye on them; and, after *The Origin of Species* was published, we find first Professor Turner and then Professor Struthers take up the investigation of their structure in earnest. By 1889 Professor Struthers had made dissections of 11 specimens, representing most of the species which become stranded from time to time on the shores of Scotland.* Nowhere will you find more accurate records and finished studies of special adaptations and of vestigial structures than are to be seen in publications of Sir John Struthers. His investigations were carried out at those times

I was greatly elated when Sir John Struthers asked me to stay at college with him on a Saturday afternoon during the winter of 1885-86, to assist in dissecting parts of the Tay whale. He was then examining the genital organs. I must have been a chatter-box; at least he suddenly stopped me with the exclamation that I had raised over fifty subjects for discussion in less than fifty minutes, and that I must really learn to think consecutively. To my regret I was never again allowed to assist him. My friend, the late Dr. Charles Angus, became his favourite assistant. He was fortunate, as is so often the case with anatomists in Scotland, in having a most skilled and sagacious anatomical assistant in Mr. Robert Gibb, a genuine working-man naturalist, who became assistant in the anatomical department in 1872. He retained his post under Professor Reid until he died, on 23rd May 1911, an old man, and regretted by generations of Aberdeen medical students.



SIR JOHN STRUTHERS AND HIS ANATOMICAL ASSISTANT, ROBERT GIBB,
SURVEYING THE BODY OF THE WHITE WHALE (1886).

when other men take their leisure, and under circumstances which would have turned most men away. When, in 1876, the *Challenger* returned with her spoils, collected in all parts of the world, the task of investigating the structures of the mammals fell on Sir William Turner and his pupils. It was while investigating the anatomy of the marsupials that Professor Cunningham came to formulate his theory of the primary arrangement of the musculature of the hand and foot. Thus we see that in the later decades of the 19th century, while microscopic anatomy and embryology were mainly engaging the attention of the continental anatomists, in Scotland their professional brethren were seeking to lay our knowledge of the human body on the broad basis of comparative anatomy.

RESEARCH ON THE ORIGIN OF MAN.

From 1860 onwards the anatomists of Scotland came more and more under the influence of the evolutionary movement. Darwin's *Origin of Species* (1859); his *Descent of Man* (1871); Huxley's *Man's Place in Nature* (1863); and Lyell's *Antiquity of Man* (1863) led them to study the human body in another way. Variations in the form and arrangements of parts so frequently found in man's body were studied and recorded, with a view to throwing light on man's origin. With the same object in view the anatomy of the anthropoid apes became a favourite and profitable subject of investigation. Although no remains of very ancient man—such as were found from time to time in Germany, Belgium, France, and Java—were found in Scotland, nor do we expect that fossil remains of man will ever be found within her borders, yet such discoveries were watched with interest and examined critically in Scotland. Knox had studied the races of mankind, but his brilliant speculations were ill calculated to form the basis of further research, and died with him. An Edinburgh graduate, Dr. James Cowles Prichard, was the leading anthropologist in the first part of the 19th century. When he died in 1848 he left a monument of splendid work behind him, but no school of disciples. In 1852 Dr. John Beddoe, who died in 1911, arrived in Edinburgh from University College, London, became a medical graduate of this University, and set out to make an anthropological survey of the Scottish people—the first ever made. Soon after 1860 the French School of Anthropologists, of Broca, Quatrefages, Hamy, and Topinard, systematised the methods of anthropology; towards the end of the century their methods were being introduced.

Throughout this period (1860-1899) craniology was a subject of study and research at Glasgow, Aberdeen, and Edinburgh; collections of crania and skeletons of all the races of mankind, both ancient and modern, were being formed in connection with the anatomical departments of the universities. With the assistance of his students Sir William Turner made the collection in the University Museum one of the best in the world. Towards the end of the century his memoirs on the osteology of the races of mankind began to appear, but the one which must interest us most is that on the *Craniology of the People of Scotland*, which he issued in 1903. Is it not a strange fact that Scotland should owe the first contribution to her physical anthropology to Beddoe and Turner, two Englishmen? Professor Struthers, and especially his successor at Aberdeen, Professor Reid, realised the need to preserve and record those remains of ancient man which are occasionally exposed by the plough or spade; these old bones are documents from which the history of races in Scotland may yet be written. Professor Bryce has shown how such documents may be utilised. By the end of the 19th century Scottish anatomists had begun to realise the necessity of making an anthropological survey of their own people, of seeking to analyse the various racial ingredients out of which the modern Scot has been evolved. By 1895 Professor Reid of Aberdeen had equipped and placed in working order an anthropological laboratory in his university, and with the assistance of the members of the Buchan Field Club set out to survey the people in the north-east of Scotland.

RESEARCH IN APPLIED ANATOMY.

It must not be supposed that the practical anatomy of the human body was neglected in Scotland during the last 40 years of the 19th century. In the main the improvement in our knowledge made then relates to observations concerning the exact shape and relationship of parts. One of the most outstanding contributions of this period is *The Topographical Anatomy of the Child*, which Professor Symington published in 1887, when lecturer here at the School of Medicine. The anatomy of the child had been neglected. The method he used was that introduced by Pirogoff in 1856 and popularised by Braune of Leipzig ten years later, namely, of studying the exact relationship of parts by making accurate sections of the frozen body. During the same period Dr. Berry Hart employed this method in producing a

standard *Atlas of the Female Pelvis*. Indeed much of the best practical work of this period was done by men who were not professional anatomists. Before he left Edinburgh in 1877 Dr. Matthews Duncan had made additions to our knowledge of the human pelvis of the most important kind. Dr. Robert Foulis's investigations of the human ovary deserve more than a passing mention. The researches of the late Dr. Alexander Bruce on the anatomy of the spinal cord and of the mid-brain are sufficient to place him in the first rank of the Scottish anatomists of his time. The studies which Professor Ogston of Aberdeen made on the growth of bone and cartilage in 1875 and 1877 have not received the attention which they merit. To pathologists such as Professor D. J. Hamilton and Professor W. A. Welsh we owe studies in the anatomy of the corpus callosum and on parathyroid bodies. In the last two decades of the century we see the method introduced by Professor His of Leipzig, of studying the viscera after injecting the body with a "hardening" solution, being employed in Scotland; the use of formalin for this purpose became very general after 1895. The introduction of this method led to a redescription of the viscera. About the same date (1895) it became possible, thanks to the discovery of Röntgen, to illuminate the living human body and thus study its anatomy. The revolution which this method is destined to effect lies in the 20th century, but we note that Mr. Harold J. Stiles had realised its value and applied this means to anatomy by 1898.

A survey of the work done in anatomy during the lifetime of Sir John Struthers shows the change which had affected the outlook of our anatomists. One can see that the study of form became more and more prominent, while the study of function came to have quite a secondary place in their consideration.

OTHER ASPECTS OF SIR JOHN STRUTHERS'S CAREER.

Now I have come to the end of my task, and it must be very apparent to all who knew Sir John Struthers that in limiting my survey to the research work—the produce of an anatomist's leisure time—I have done his memory less than justice. From the day he began to teach anatomy under the aegis of this college in 1845 until the day of his death in 1899 he fought continuously and courageously for freedom to teach and to research, for the progress of research, of true knowledge and of medicine, and of medical education, for liberty of thought, and for the rights of

institutions and of women; and yet all these endeavours of a many-sided career I have passed unnoted. A bare account of his researches would have constituted a worthy subject for this lecture, but that is the last theme Sir John Struthers would have liked me to adopt. I have sought to follow him as a student of history, and I am not worthy to be his pupil unless I have his courage to speak out freely and fully what I believe to be the true lessons which I have learned from this study.

SUGGESTIONS DRAWN FROM A STUDY OF THE HISTORY OF ANATOMY IN SCOTLAND.

I have been surveying the history of anatomy in Scotland with a purpose, one which I can best introduce to you by relating how it came to take hold of me. I owe to Sir John Struthers the impulse which made me a student of anatomy. Under his inspiration, during 1884, 1885, and 1886, I became an enthusiastic follower of Owen, Huxley, and Darwin; the origin of man became with me a more important matter than the healing of his body. In 1895, after spending seven years in the kind of investigations which was most likely to throw light on man's origin, I came to teach anatomy at the London Hospital and continue my researches. It was then, as my students passed into the wards, that I came to doubt whether my teaching and my research were really the best possible to adapt medical students for their life's work. They had to deal with cases of appendicitis; I could not explain to them why the appendix was present in the body, nor why it was placed in the loin and shaped as a narrow blind tube. They saw cases of disease of the antrum of the mastoid, and yet, although the shape and position of this small cavity could be described with accuracy, no hint as to why it was there and what function it served could be offered. They had to examine patients with the accessory chambers of the nose full of pus, but why such large air chambers should exist in man could not be explained. They daily saw children with enlarged tonsils or with adenoids, but we could not tell them why these structures were placed in the throat, nor give an explanation of their anatomy. They saw the gall-bladder opened for the removal of gall-stones, but I knew nothing of its functions nor of its anatomical meaning. They saw the prostate being removed for disease, but the reason of its existence in the human body was not thought of. Even with such vital and well-known organs as the heart and lungs we

could offer our students no satisfactory explanation of their shape, of the manner of their fixation, of the arrangement of their musculature, nor of the peculiarities in their nerve and blood supply. When, however, I became acquainted with the works of the anatomists who led the way at the end of the 18th century—of the Hunters, the Monroes, and Bells—I found their efforts were directed to answer such questions as I have just mentioned; they studied anatomy to understand the meaning and function of the parts of the body. At the beginning of the 20th century we were studying anatomy to describe form. It was to see how this revolution had occurred in our outlook that I made a study of the history of anatomy during the 19th century. We see that the anatomy of the Hunters, Monroes, and Bells was not really killed by the separation of the teaching of anatomy from physiology. It was those gifted non-medical children of the French Revolution—Cuvier, Geoffroy St. Hilaire, and Lamarck—who killed the study of function. We see the movement started by them, elaborated by Owen, and transformed by Darwin become domiciled in Scotland for the greater part of the century. That movement has been prolific in its results; it has laid our knowledge of the human body on the sure foundation of comparative anatomy; but now, it seems to me, has come the time to look to the future. A knife and forceps, with close observation and hard thinking, will accomplish much, but to face the modern problems of anatomy with such an outfit is to use a muzzle-loader where a repeating rifle is available. In recent times we have seen that the problems of human anatomy are yielding most readily to those who use the experimental method. By stimulating the cortex and by causing artificial degeneration of nerve tracts the anatomy of the brain has been gradually discovered. Our modern knowledge of the anatomy of the heart and of the visceral nerves of the body are largely based on the experimental work of Gaskell. I need not multiply examples. The modern anatomist, if he is to help in solving the problems of the human body, must avail himself of the methods of the professed physiologist; he must study the living as well as the dead body; he has to seek assistance in embryology, in comparative anatomy, and in those experiments of which, unfortunately, disease makes man so often the subject. We have come to the time when we anatomists must reconsider our methods and our aim. At least that is the inference I draw from a study of the history of our subject in Scotland during last century. In short, we have to study function, which is the key to form.

THE POSITION OF THE STOMACH AS A GUIDE TO
PYLORIC OR DUODENAL DIFFICULTY.*

By WILLIAM RUSSELL, M.D., F.R.C.P.,

Physician and Lecturer on Clinical Medicine, Royal Infirmary, Edinburgh.

EIGHT years ago I submitted a communication to this Society on the subject of hyperchlorhydria in which I dealt with the symptoms, probable nature, and treatment of the condition. Last year I published a paper which again dealt with the subject, and there is not time now to do more than state that hyperchlorhydria has generally come to be accepted as a definite clinical entity. I would add, that it is also a generally recognised fact that gastric hyperacidity is often associated with gastric ulcer, that in fact gastric ulcer is probably nearly always due to such hyperacidity. It seems to me to be equally true that pyloric and duodenal ulcer are usually associated with this over-secretion, that in fact it is an important factor in their etiology. I do not attempt to argue these points to-night.

It is unnecessary that I should enlarge upon the question of duodenal ulcer. I think, however, that I ought to state that in my experience the perforation of acute duodenal ulcer is as rare as is the perforation of acute gastric ulcer. There is abundant operative evidence that such ulcers have healed; there is also much clinical evidence that under favourable circumstances they heal at least as readily as gastric ulcers heal.

It always seems to me important to recognise that ulcer in the stomach and duodenum is not necessarily always of equal severity, that in some cases there is certainly a considerable depth of tissue destruction, whilst in others the loss is probably much less deep, and that in the latter the process of healing must be more easily and more quickly effected.

In all acute ulceration in these regions the ideal before the clinician ought to be to obtain rapid healing. How this can best be obtained need not be discussed, but the axiom stated must be kept prominently in view. The reason is that where rapid healing is effected no appreciably bad results remain, whilst if healing is slow there is not only prolonged suffering, but there follows so much thickening and induration that the stomach outlet or the

* Paper read before the Edinburgh Medico-Chirurgical Society, 29th November 1911.

narrow channel beyond it becomes greatly diminished in calibre, with the result that the gastric contents are unduly retained. A puckered scar either at the pylorus or in the duodenum leads to difficulty in the emptying of the stomach, and this difficulty in course of time leads to the changes in the position of the stomach to which I seek specially to direct your attention to-night. I have seen one case where the difficulty in the duodenum followed upon operation for perforation of a duodenal ulcer.

It seems to me to be essential to the correct understanding of such cases as we are dealing with to keep distinct in our minds the question of ulcer from the question of mechanical obstacle to the outgoing of the gastric contents. They no doubt often overlap, but it is by realising these two distinct factors that we can hope to attain to completeness of differential diagnosis.

A few years ago I submitted to this Society a paper on "Congenital Pyloric Stenosis in the Adult," in which it was shown that this congenital narrowing led of course to difficulty in the emptying of the stomach; since then I have seen one example of a pylorus situated so high up in the abdomen that it suggested the conclusion that the stomach must have always worked at a great disadvantage, and that it was no matter for surprise that the symptoms of such difficulty should have become prominent under the strain of work in early adult life.

The difficulty in the emptying of the stomach is of course the cause of the retention of gastric contents, and it is the retention that is the cause of the symptoms.

The most evident result of a difficulty to the outgoing of gastric contents is of course "dilatation" of the viscus. So much is universally known, but the term is much too general and vague for the purposes of differential diagnosis in this region. There is a dilatation of the fundus; there is ptosis of the body of the viscus; there is ptosis of its inferior border; and there is overlying of the pylorus by the distended anterior wall of the stomach being carried far to the right of its normal position.

In all these, with the exception of the first and last, the position of the axis of the viscus in relation to its outlet is so altered that under the most favourable of conditions it can with difficulty be completely emptied.

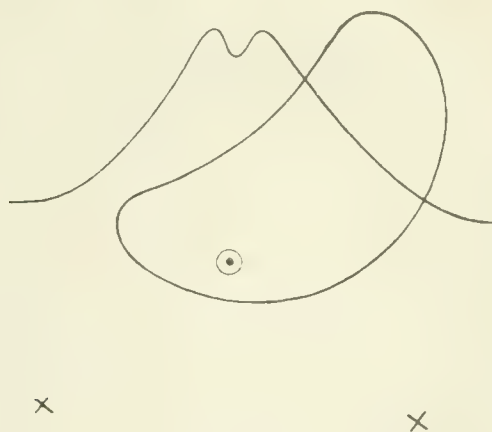
To-night I cannot attempt to deal with more than one of these, namely, the position of what, for clinical purposes, I call the right border of the stomach.

The methods by which the position of the stomach is determined are visible peristalsis, percussion, succussion, and auscultatory succussion. The position of abnormal stomachs can be determined without X-ray examination, although such examination is interesting and confirmatory in certain instances.

I shall now show you outline figures of the position of the stomach in fourteen patients, thirteen of whom were operated on. All of the thirteen made excellent recoveries. This is merely a selection of recent cases. These patients were operated on by Professor Caird, Mr. Cotterill, Mr. Wallace, Mr. Miles, and Mr. Struthers.

The outline figures were traced directly from the body by means of tracing-paper, the position of the mammae, the costal margin, the umbilicus being indicated, and usually the pubes and the anterior iliac spines also.

CASE A.—Was a man of 60 years of age. At the age of 20 he began to have symptoms of hyperchlorhydria; at the age of 40 he had symptoms of duodenal ulcer, and was treated in the Royal Infirmary for gastric dilatation and taught to wash out his stomach.

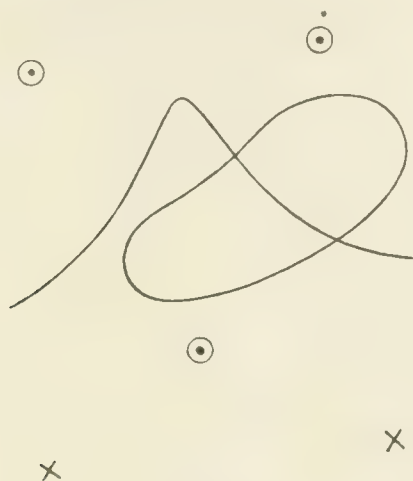


CASE A.

He had done this for 20 years, but even with two washings a day his discomfort was so great that he was sent to me. The annexed is a tracing of his stomach. There was great stenosis in the first part of the duodenum. He did very well.

CASE B.—Was a man of 48 years who had suffered from his stomach for 11 years, but was well nourished and remarkably

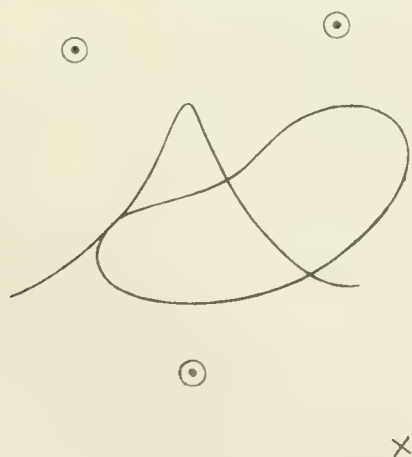
healthy looking. The stomach is not a large one, and it is some distance from the umbilicus, but its right border is considerably to



CASE B.

the right of the middle line. There was a small thickened scar or ulcer at the pylorus. He did well and got entire relief.

CASE C.—A man aged 45 had shown symptoms for only a few months, but from the position of the right border of the stomach we decided on a gastro-enterostomy being done. At the operation there was a thickening at the pylorus which the surgeon thought



CASE C.

was not malignant, and did not do a pylorectomy. Here it is to be noted again that the stomach was not very large and was far above the umbilicus, but that the right border was far to the right.

VACCINE THERAPY.*

By JAMES RITCHIE, M.D.,

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Physicians, Edinburgh.

IN considering the question of vaccine therapy it is well to have a clear idea of the scientific principles underlying the use of vaccines in the prophylaxis and treatment of disease. As an initial consideration, we must differentiate between the two great groups of bacterial diseases, namely, the bacterial intoxications and the bacterial infections proper—the true infections. In the bacterial intoxications, of which diphtheria and tetanus are the best examples, the bacterial multiplication is confined to superficial parts of the body; the organisms do not pass into the blood, and the pathogenic effects are originated by fluid poisons formed at the focus of bacterial growth and absorbed into the body. These fluid poisons are readily formed by the organisms when growing in artificial cultures, and they can be obtained in an impure condition by filtering the cultures free of bacteria. In the true infections, on the other hand, the foci of bacterial multiplication may be superficial, as in streptococcus infections of the tonsils, but usually occur within the body tissues. The outstanding local lesion here is inflammation, frequently accompanied by general disturbances indicated by fever, loss of weight, etc. An important fact is that whatever the cause the effects produced are similar, there being no essential pathological difference between the fever arising in a boil caused by the staphylococcus pyogenes, in a pneumonia caused by the pneumococcus, and in that seen in the course of tuberculosis. There is, in other words, no evidence of any specific effect on some particular tissue comparable with, *e.g.*, the disturbance of the function of the grey matter of the spinal cord in tetanus.

It is essential to note that at present nothing is known of the processes by which the organisms concerned with the true infections originate general disturbances in the body. It is usual to attribute such disturbances to the elaboration of toxins, but this phraseology must only be used with the reservation that so far as our present knowledge goes no scientific definition of the toxic process can be

* A paper read at the opening of a discussion at the Edinburgh Medico-Chirurgical Society, 29th November 1911.

given. In this connection it may be stated that in cases of such organisms as those alluded to, namely, pyogenic cocci, pneumococci, the tubercle bacillus, no free formation of fluid toxins can be observed in cultures. The so-called toxic effects are, however, associated with the breaking up of the protoplasm of the bacterial cell. This occurs by autolysis in cultures in which individuals are dying, and it can be brought about artificially by treating bacteria with various physical and chemical agents. Similar processes, there is evidence, occur in organisms growing in the tissues. Here also individuals are constantly dying, and with death the cohesion of the protoplasm becomes diminished. It may indeed be laid down as a general characteristic of a true infection that the bacteria multiply in the tissues, that many die, and that the protoplasm in a more or less particulate condition passes into the neighbouring lymphatics and thence into the general circulation.

From the standpoint of present-day pathology the relationship of alterations in bacterial protoplasm to apparently toxic effects is complicated by the facts recently observed regarding the hypersensitiveness which, under certain circumstances, the body may manifest towards almost any foreign albumen introduced into it. Thus white of egg can be injected daily into a rabbit without effect, but if a period of ten days elapses between the first and second dose, the animal, in a large number of instances, will die in a few minutes. There is thus the possible complication of the apparently toxic effect being due, not so much to an inherent toxicity of the protoplasm, as to an alteration in the tissues of the host whereby these become specially susceptible to the action of substances which, under other conditions, might be innocuous. If these facts be borne in mind no harm results from the application of the convenient term "toxic action" to the processes at work in the true infections.

The next point for notice is the distribution of living bacteria in the body in the true infections. The general statement may be made that usually such distribution is focal, there being either a single focus or several points of multiplication. Even in many conditions which are described as septicæmic, for example puerperal septicæmia, the main source of danger lies in the occurrence of bacterial multiplication in one centre. Care is thus necessary in the use of the term "septicæmia." In its strictest application the word should denote a condition where active multiplication of bacteria is taking place in the blood, and where this

constitutes the essential danger to life. This is an uncommon occurrence in human infections, and is chiefly seen in plague and in certain excessively rare streptococcal infections. In human disease the commonest occurrence is the focal multiplication alluded to, in the course of which a few organisms may escape and be found in the circulation, such "escapes," as they may be called, being frequently observed, for example, in pneumonia, typhoid fever, etc.; the number of escaping organisms is small as is indicated by the fact that when a bacteriological examination of the blood is called for it is customary to take a relatively large quantity, namely, 5 to 10 c.c., for the performance of the test. The survival of the organisms in the blood is probably usually of short duration—in pneumonia, for instance, although escape is common, the development of secondary foci outside of the lung is relatively rare. From our present standpoint it may be said that these living organisms escaping from the focus of infection, acting along with the more or less particulate autolysed products of dying bacteria, are of importance in stimulating the general resistive capacities of the body to which allusion will presently be made.

We may now proceed to ask how recovery from infective disease occurs. If all infective disease is of a toxic nature in the sense in which the term has already been defined it is manifest that recovery might be dependent on the fact that a non-lethal dose of the effective poison had been absorbed. There is, however, evidence that when infection occurs a mechanism in the body is stimulated whose activity results in a situation inimical to the life of the invading bacteria. Such evidence is derived from a consideration of experiments in which the injection into an animal of living or even dead bacilli in non-lethal doses causes the development of resistance to subsequent infection with the noxious agent in what would ordinarily be a fatal amount. There has been endless controversy as to the processes which go on in the body of such an immunised animal, and which are responsible for the appearance of this new quality of resistance. For our present purpose it is enough to say that the introduction of any foreign proteid into an animal's body stimulates some mechanism whose possible normal functions are either the utilisation of such proteid to meet the food requirements of the body or the conversion of proteid which would be harmful into a harmless or inert substance. One line of proof for the existence of such a mechanism is based on the fact that the introduction of foreign proteids is very frequently followed

by the appearance of new properties in the body fluids, the presence of which is capable of physical demonstration. The substances carrying these properties are usually referred to as antibodies to the particular substance introduced, and an outstanding feature of such substances is the possession of a high degree of specificity; that is to say, that any given substance stimulates the production of an antibody which, generally speaking, is only capable of acting on the substance which gave rise to it. Taking bacteria as an example of harmful proteids, the antibodies which appear may for our present purpose be looked upon as chiefly belonging to two groups. These are—*First, Bactericidal bodies.* Thus when cholera vibrios are introduced into an animal its serum develops the quality of killing cholera vibrios *in vitro*. *Secondly, Opsonins.* These are bodies which render bacteria more liable to be ingested by the phagocytic cells of the body. Thus if leucocytes be washed free of serum and brought in contact with an emulsion of staphylococcus pyogenes aureus in normal saline the leucocytes will manifest little or no tendency to take the organisms up into their protoplasm, but if the cocci have previously been subjected to the action of the serum of an animal injected with staphylococci, the leucocytes will manifest active phagocytic function and englobe the organisms in large quantities. It may be stated in passing that the sera of untreated animals not infrequently manifest both bactericidal and opsonic qualities, but as some differences probably exist between these and the corresponding qualities which develop as the result of previous treatment with bacterial products, it is well for the sake of clearness to confine our attention to the latter.

Whether in any particular case the resistance developed during an immunisation is directly due to the circulation of such antibodies in the fluids of the living body must be looked upon as still undetermined, but it is at any rate sufficiently established that the presence of such substances in the serum is an index that the living body is in a position to resist bacterial inroads. It is extremely important to notice that in different affections differences exist in the relative importance to be attached to the development of a bactericidal quality on the one hand and of an opsonic quality on the other, though both may be co-existent in any particular case. Thus with the typhoid bacillus the development of a bactericidal serum readily takes place although opsonic qualities are also present. In the case of infection with the pyogenic cocci, pneumococci, the tubercle bacillus, etc., the appear-

ance of bactericidal qualities is in the background, and the outstanding feature is the development of opsonic properties. One great contribution of Wright to the immunity question consists in the recognition of this fact, which is all the more important in view of the organisms mentioned being by far the most serious agents of bacterial infection in man.

The existence of an antagonistic mechanism has an important bearing on natural recovery. Keeping in mind the essentially focal nature of infection, it is to be recognised that the bacterial protoplasm passing into the body not only produces toxic effects but is the means by which the antagonistic mechanism is stimulated. It is difficult to disentangle the two processes—the harmful and the beneficent—in fact we do not know how far, *e.g.*, a moderate pyrexia may not be an indication of the development of resistance. Probably, however, the absorption of a small amount of bacterial protoplasm favours resistance, while a large dose submerges the reactive process. In any case it is by auto-inoculation, as Wright denominates the phenomenon, that natural recovery most likely comes about.

In applying these facts to explain the good effects following from the prophylactic or therapeutic uses of vaccines we may make the general statement that when the body is successful in preparing itself for a bacterial invasion or for resisting such an invasion when it occurs, it does so in consequence of the activity of a mechanism which in acting throws into the body fluids substances inimical to the vitality of the infecting bacteria.

These constitute the chief pathological facts bearing on the subject of vaccine therapy. We may now pass to consider the constitution of vaccines and their probable mode of action. In the earlier attempts to combat therapeutically the effects of true infections recourse was had to serum therapy. Here some one of the larger animals was subjected to a long series of injections with the causal bacterium, and its serum was used after the analogy of the antitoxic sera employed in the treatment of bacterial intoxications for the purpose of combating the effects of the true infections in man. The principle underlying this treatment was the passive transference of the immunity developed in the animal treated to aid the human organism in combating the effects of the bacteria growing upon it. In vaccine therapy the principle is entirely different; the object here is actively to stimulate the capacities of the human organism so as to enable it to resist infection if this should occur, or to aid it in throwing off

an infection already established. The means adopted is the injection of the causal organism modified in some way so as to prevent its actual multiplication in the tissues. Such modification usually consists either in killing it or in applying a process which disintegrates its protoplasm, the former being the method most commonly in use. The procedure is to take a well-grown culture on sloped agar and to wash this off with a small quantity of normal saline. The bacillary emulsion thus formed is well shaken, preferably in a shaking machine, in order to disintegrate any masses of bacteria present, and to get so far as possible a suspension of single bacterial cells. The number of bacteria present in a unit volume is estimated. The organisms are then killed at as low a temperature as possible, usually from 60 to 65° C.—there being evidence that a vaccine exposed to higher temperature may lose a certain amount of its efficiency. The amount of vaccine it is desired to give is placed in a sterilised ampoule which is sealed. For use the point of the ampoule is broken off, the contents are sucked up into a sterile hypodermic needle and injected subcutaneously into the supraspinous or subclavicular regions, over the deltoid or into the flank, the skin having previously been purified with lysol or iodine.

In the preparation of a vaccine a most important point is the standardisation, the dosage being reckoned in terms of the number of bacteria injected. In the case of ordinary vaccines this is effected by counting, by an appropriate technique, the number of bacteria in a unit volume. The only case where, instead of killed bacterial cells, the disintegrated bacterial protoplasm constitutes the vaccine is that of the tubercle bacillus. Here the objection to the use of bacteria which have been merely killed is that these, if injected, may give rise to local granulomata resembling those caused by living bacilli. The vaccine is therefore prepared by grinding tubercle bacilli in an agate mill in saline solution until on centrifuging no visible deposit occurs. Such preparations constitute the two tuberculins chiefly used—Tuberculin R. and the Tuberculin Bacillary Emulsion. These differ slightly in their composition, and the latter is generally employed. Koch's Old Tuberculin, which was essentially a glycerine emulsion of autolysed tubercle bacilli, is little used for vaccination work. With tuberculins the doses are reckoned in terms of the weight of the dried bacillary mass with which the making of the vaccine was started.

We may now look briefly at the theoretical views held as to

the *rationale* of the efficacy of vaccines. These will be understood if the principles enunciated at the commencement of this paper be kept in mind. As has been stated, in the true infections bacterial protoplasm in a more or less particulate condition is probably constantly being absorbed from the focus of active multiplication. The resisting mechanism of the body is thereby stimulated, and the death of the living bacteria in the local focus may be caused and recovery brought about.

Now a vaccine consists of dead and often broken up bacteria, and is thus composed of protoplasmic material analogous to that passing into the body from a focus of infection. The stimulation of the resisting mechanism which occurs in untreated disease therefore takes place. If a vaccine be prophylactically applied the body fluids as a whole are rendered inimical to bacterial life, so that when organisms gain entrance they find a body prepared to resist their inroads, and either cannot multiply at all or only do so to a limited extent. Where a vaccine is used therapeutically the difficulty may appear to present itself that it is absurd to introduce further doses of bacterial poison into a body which is already suffering from the effects of the circulation of such substances. If, however, the focal nature of the infection be borne in mind, it is evident that while under ordinary conditions the body may be in a position just to prevent the infection becoming generalised, it may not be capable, as it were, of carrying the war into the enemy's camp, so as to destroy the bacteria which have already gained a footing. This may be effected, however, by calling into play through a vaccine reserve sources of the general resisting mechanism, the stimulation of which may so flood the local focus with antibodies as to kill off the invading bacteria. Several facts supporting this view are known. Thus there is evidence that in many cases mechanical factors may prevent antagonistic substances reaching a focus of infection. For instance the pus of an acute abscess has been shown to be poor in antibodies, but when the local tension is relieved by incision the fluids draining from the wound may show evidence of containing antagonistic substances. The determination of lymph from the surrounding parts into the abscess cavity is looked upon as responsible for this alteration, and the gradual sterilisation of the abscess which follows evacuation of pus is also thus accounted for. It is also known that as the result of the use of a vaccine therapeutically a rise takes place in the content of the blood in antibodies, and therefore the explanation just given of the curative effect

produced by vaccine therapy in an already established infection is probably proximately correct.

We may now pass to consider the sequence of events which occurs when a vaccine is injected. The important fact here is that the beneficial effect is not at once attained, a definite time being necessary for the formation of antibodies to take place. In cases where the development of these can be followed with the greatest accuracy it is found that very little change can be observed in the body for from 36 to 48 hours, but when this period has elapsed the substances may appear in the blood serum in considerable quantities almost by crisis. There is evidence that during the preliminary period not only may no evidence be obtainable that the antagonistic mechanism is at work, but it may be true that after the injection of a vaccine the body may be more than usually susceptible to invasions by the bacteria. This is usually referred to as the occurrence of a "negative phase." In successful vaccination this phase is followed by that of free antibody formation, usually referred to as the "positive phase." The existence of the negative phase constitutes one great difficulty in the therapeutic application of vaccines, and especially in chronic infections its presence is difficult to detect by clinical observation. The importance of the recognition of the negative phase lies in this, that in chronic infections it may be unduly prolonged, and that if, during such a period, a fresh vaccination be practised, the diminution in resistance may be such as to favour an active proliferation of the bacteria, and thus lead to an increase instead of a diminution in the pathological processes present.

The great difficulty underlying vaccination procedures for a therapeutic end is, however, that the resources of the antagonistic mechanism of the body are, when bacterial protoplasm is concerned, exceedingly limited, and here the importance of differentiating between the bacterial intoxications and the true infections comes to the front. It is easy when working with diphtheria toxin to immunise an animal so that it can successfully withstand the injection of many thousand times the amount of poison which, in its untreated condition, would have been fatal, but no similar statement would be true of injections of dead bodies of a bacterium. Here it is with the greatest difficulty and with constant unexpected and inexplicable failures that an animal can be immunised against even a small number of minimal lethal doses, and this limitation of the antagonistic mechanism must always be kept in the foreground in the use of vaccines. It

is possible so to treat an infected organism that it may be capable of killing invading bacteria, but there is very little reserve of capacity to fall back upon, and it is easy to pass from success to failure and to do more harm than good by vaccine treatment.

The question thus arises of how the effects of any vaccination procedure are to be judged of so that the treatment may be followed by the maximum of good and by the avoidance of harm. An important point here is that in different infections the degree of harm done may vary. Thus, as in many suppurative skin conditions where general infection practically never occurs, the effect of an overdose of vaccine merely is to delay the cure, and no permanent harm is done. Where, however, as in tuberculosis, there is ever present the risk of a local infection becoming generalised, any mistake may be of grievous import to the patient. This danger is emphasised by Wright¹ and his school, but it would be of much interest if those with experience of tuberculin injections would discuss how frequently an unusual reaction follows gradually increasing doses of tuberculin, and further, how far these, when they do occur, interfere with the ultimate progress of the patient. In cases of ordinary disease, where the lesion treated is superficial, the clinical progress of the case is a measure of the success or failure of the treatment. Thus a fresh outcrop of boils after a dose of a vaccine is an indication that this particular administration has not been justified. In certain less superficial conditions clinical evidence may constitute a sufficient criterion. Thus, in cystitis due to the bacillus coli, diminution in pain and in frequency of micturition and the disappearance of pus from the urine form valuable indications of the success of a vaccination. The most difficult, and at the same time the most important, cases are where localised tuberculosis is being treated. Here the clinical course is so chronic, the change from week to week, or it may be from month to month, may be so small, and the fact that under ordinary treatment improvement may occur, all make the application of vaccine therapy excessively difficult, and it is in these cases that the establishment of more exact criteria of progress is most to be desiderated.

It is thus in this connection that the question of the possibility of judging of the effects of a vaccination by studying the changes in the content of the serum in antibodies arises. As has already been stated, the opsonins probably form the most important of these substances in ordinary human infections, and especially in tuberculosis. Of the existence of such substances there is no

doubt, but great difficulties have arisen as to the significance to be attached to variation in the amount of these bodies in the serum during a natural illness or during an immunisation process. First of all the reliability of the technique by which they are measured has been challenged. This technique consists in the estimation of the opsonic index in which the effect of a patient's serum in sensitising bacteria is compared with that of a healthy individual. As the essential procedure here consists in obtaining an average value for the number of bacteria taken up by phagocytic leucocytes in a blood preparation, it has been questioned whether this can really be obtained by taking toll of only a fraction of the total number of phagocytes present. Various attempts have been made to apply mathematical principles to the solution of the question, but it must be held that at present no sufficient data have been available for a mathematical investigation, so that the matter is still *sub judice*. Granted, however, that the technique is reliable, there remain difficulties regarding the interpretation of variations in the opsonic content of sera, for constant changes in the amount present are possible. This may arise from variations from day to day in the amount of response originated in the body by the absorption of varying amounts of bacterial protoplasm from a focus of infection. The opsonic method is certainly the only serological method at present available for following the course of an immunisation, but the laborious nature of the procedure involved and the impossibility of an opsonist maintaining his training without daily practice contribute to make its use at present impracticable. In difficult vaccination procedures it lies with the clinician to define with the most laborious care the signs and symptoms of successful and unsuccessful reactions in the case of each infection.

We may now proceed to take up the practical results which have been obtained in the application of vaccination methods. First of all we may look at the use of vaccines as prophylactics. The three diseases in which vaccination has been used prophylactically are typhoid fever, cholera, and plague.

The case of typhoid fever is of especial historic interest as it formed the starting-point of Wright's great work. The vaccine here consists of a bouillon culture killed by heat made by the growth of a typhoid bacillus of definite virulence. The method is to inject 500 million bacteria and to follow this up 10 days later by a dose of 1000 million. Usually very little inconvenience follows the injection, there being some pain and stiffness at the site of inocula-

tion, with, it may be, some tenderness of adjacent lymphatic glands and slight pyrexia, all passing off within a few hours. A large statistical basis relating to the efficiency of the treatment is in existence. In 49,600 cases observed, mainly during the South African War, 8600 were inoculated, and of these 2·25 per cent. subsequently contracted the disease, with a case mortality of 12 per cent. Of the 41,000 uninoculated 5·75 per cent. subsequently contracted the disease, with a case mortality of 21 per cent. More recent statistics in the British Army give even more favourable results, the case incidence being ·7 per cent. and the case mortality 4 per cent., and similar results have been obtained in the German Army, in which the treatment has been adopted. There can be little doubt that all persons going to India or to any other region where typhoid fever is rife ought to be subjected to the treatment. Similar facts have been obtained with regard to cholera and plague.

In trying to estimate the results which have been attained by vaccine therapy in actual infections there are serious difficulties. In by far the greater number of diseases in which the treatment has been applied we have to deal with a chronic condition which under natural conditions may manifest alternations of improvement and exacerbation, and which may terminate in cure even when untreated. When, as, *e.g.*, in tuberculosis, the disease is dangerous to life it is necessary to apply simultaneously every therapeutic measure possible, and the estimation of the part played by each in any improvement is impossible. The only practical test which can be applied is the observation of clinical improvement or deterioration. Thus ultimately judgment must consciously or unconsciously turn on a statistical inquiry in which a series of cases treated by this method is compared with a series untreated. In certain diseases some data for a comparison exist, but manifestly such series must be of great extent in order that disturbing factors may be submerged, *e.g.*, on the one hand the part played by unusual susceptibility or resistance in the patient, and on the other that due to the too sanguine or too sceptical habit of mind of the observer. It cannot be too strongly insisted that opinions based on experience of a few cases, such as literature abounds in at present, are largely valueless. There are only two sets of circumstances which sometimes warrant an opinion being given on a limited experience. These arise when a sudden improvement takes place as the result of vaccination either in a chronic disease which has resisted all previous treatment or in an acute illness

of fatal import. An example of the latter is found in cases of puerperal septicaemia reported by Hale White.¹⁷ Even here great caution is necessary in drawing conclusions. The present position of the whole subject may be said to be that there is almost no disease of bacterial origin, whether acute or chronic, in which vaccine methods have not been employed. With regard to most of these experience has been so limited that no statements as to the results obtained are possible. In what follows reference is merely made to several conditions which on the one hand furnish examples of what has been attained and on the other illustrate the difficulties which are encountered.

Chronic Skin Conditions.—First of all here we have the group which includes boils, small or large, single or multiple, in which there is little doubt that the pyogenic staphylococci play an important etiological part. As is well known, these cases are often characterised by the constant recurrence of suppurative lesions extending over months, or it may be years. The vaccines employed in the first instance are usually the stock preparations which are in the market, and which are made by mixing various strains of organisms isolated from skin suppurations. Where these are inefficacious it is advisable to have a special vaccine prepared from the organism isolated from the patient's own lesion. With regard to dosage it is laid down by Wright¹ that where the patient is developing an isolated furuncle arrest of the condition will usually result from the injection of 100 million staphylococci, to be followed up four days later by a dose of from 250 to 300 millions. In chronic cases the initial doses ought to be the same, but as the treatment progresses with favourable results the amount may be gradually raised to 500 million, the inoculations being given with from 3 to 7 days' interval. The lesions being essentially superficial, the effects of the treatment can be judged of by whether or not an improvement or exacerbation of the symptoms follows any particular dose. The treatment has been widely applied, and Stoner³ has collected the results of 140 cases observed by 33 workers. Of these 125 are reported to have been cured, 12 improved, and 3 not benefited. The latest reports of Wright's⁵ own cases give a record of 104, of which 73 were cured, 29 were better, and 2 were unchanged or worse. Needless to say it is often necessary to apply the treatment for many months before a permanent change in the condition is effected. Besides furunculosis, the special skin suppuration known as sycosis has been successfully treated along similar lines.

It is necessary to differentiate acne from these ordinary skin suppurations, as the pathology of this condition is still obscure, and the part played by organisms of the ordinary pyogenic type is almost certainly secondary. A special bacillus, the acne bacillus, has been isolated alone—according to one observer from about half of the cases of the disease, and in the other half being associated with staphylococci. The part played by this organism is as yet undetermined, but the success of vaccine treatment has not been so marked as with the furuncular group. In a series of 133 cases³ treated by staphylococcal vaccines 70 (53 per cent.) have been cured, 46 improved, and 9 not benefited. Mixed vaccines have been used by Fleming⁴ in which, to an ordinary staphylococcal vaccine in the doses given above, acne bacilli in numbers from 4 to 10 millions have been added. There is, however, little apparent improvement in the results. In 68 cases treated in St. Mary's Hospital⁵ 12 were cured, 42 improved, 12 unchanged, and 2 are reported worse.

Gonorrhœal Vulvo-Vaginitis in Children.—A careful series of observations has been reported by Hamilton⁶ in which a certain number of cases was treated by small doses of vaccines and others by irrigation and ordinary methods. The test of recovery was that no gonococci were found in the vulva after six examinations extending over two months. Of the vaccinated cases 90 per cent. recovered, of the unvaccinated 70 per cent.: of the cured cases the average period necessary for the vaccine treatment to be effective was 1·7 months, and for the ordinary treatment 10·1 months. In acute gonorrhœa the results of the use of vaccines have not been striking, and it is difficult to understand success in treating a chronic gonococcal infection where the passage out of fluids from the lymphatics must be more scanty.

Tuberculosis.—Here we have to deal with the most important and, unfortunately, also the most difficult branch of the subject. First we may look at the substances used. Controversy largely turns on the views held as to the essential toxic elements of the tubercle bacillus. The tuberculins most commonly in use, namely, the Tuberculin R. and the Bacillary Emulsion, are, as has been stated, composed of the ground-up bodies of tubercle bacilli. Manifestly these preparations only contain the pathogenic elements actually present within the bacilli, and there is a divergence of view as to whether the toxic agents are present in the form or in the concentration most effective for producing an immunisa-

tion response. A variety of other modifications have from time to time, therefore, been introduced. Thus Landmann has a preparation which contains extracts made at different temperatures from bacilli freed of their fats; Denys uses a filtered bouillon culture of the bacillus; Béraneek employs a growth of the bacilli in a special bouillon, and to the filtered culture adds bacilli dissolved in orthophosphoric acid—he holds that grinding does not effect a true solution of the protoplasm such as is obtained by the use of the acid. Again, on the one hand bacilli freed from tubercle fats have been used, and on the other the fats themselves have been utilised. These facts are cited chiefly to emphasise the position that there is no agreement as to whether the best means of stimulating antibody production has been attained. This is not surprising if what has been said at the outset is borne in mind, namely, that we are totally ignorant of the essential processes underlying the pathogenic effects of the infective bacteria. But given a satisfactory means of stimulating an antituberculin mechanism in the body there are further difficulties. If, as is probable, recovery depends on antibodies reaching the invading bacteria, we must recognise that frequently in tuberculous lesions such an access to the bacilli by the body fluids is difficult or impossible. This will occur whenever bacilli are interned in a caseous focus, in which position they are largely outwith any lymphatic circulation. Thus it must be chiefly in very early lesions or in tubercular ulcers surrounded by little granulomatous deposit that vaccine treatment should meet with conditions favourable to success.

Again, in estimating the therapeutic effects of such treatment there are the facts that such a serious disease must be simultaneously attacked through every avenue open, and that without vaccines ordinary treatment is often eminently successful. Subsidiary to the last, there is the consideration that few records are available which enable us to judge of the number of cures following on ordinary treatment.

To take up the available data with regard to phthisis, Bandelier⁷ in his sanatorium service reports 383 patients with two lobes affected treated with tuberculin, and compares the results with 299 cases in the same stage treated by sanatorium methods. None of the latter were reported cured, while in 15 of the treated cases this favourable result was obtained. It is further to be noted that while in 25 per cent. of the untreated cases the patients were so far recovered as to be fit for work,

75 per cent. of those treated by tuberculin were in this condition. Ritter^s compares results obtained in his sanatorium without tuberculin during the years 1899-1903 with those obtained in 1903-1907 with tuberculin. Of 193 patients whose treatment extended over a year, from 50 to 90 per cent. of tuberculous cases were at the end of the time fit for work as compared with from 22 to 72 per cent. of those untreated.

While no similar data exist with regard to British or American sanatorium treatment, the results have apparently not been so striking, although the opinion is generally expressed that in treated cases relapses are not so likely to occur, and afebrile cases are less apt to go on to a pyrexial stage. In Britain such observers as Philip, Latham, and Lawson are agreed that early cases show distinct benefit when treatment with tuberculin is added to ordinary methods.

A very important aspect of the treatment is in cases where mixed infections are being dealt with, and it seems to be the general opinion that when pyogenic cocci are present in the lung the use of a vaccine made from these organisms alone or combined during alternate periods with treatment by tuberculin frequently results in reducing the disease to a more quiescent stage.

The outstanding feature of the modern treatment is the smallness of the initial doses used. Although considerable variations in practice obtain, the general tendency is to the use of very small amounts, frequently not more than a hundred-thousandth of a milligram of bacillary emulsion, and the maximum reached frequently not exceeding a ten-thousandth. In very few cases is the initial dose used more than one-thousandth of a milligram.

In by far the greater majority of cases the course of the treatment has been guided by clinical observation alone. It is manifest that this must be constant and close, and that any advanced reaction indicated by rise of temperature, increase of expectoration, or increase of lassitude on the part of the patient is to be avoided; that the best results are obtained in cases where the disease is limited to one lobe; and that the treatment of febrile cases is only to be undertaken by those with extended experience.

Tubercular Glands.—The characteristic of this lesion is the fact that for long periods the bacilli are closed up in the gland through the occurrence of caseation. If it were possible to obtain such cases before caseation had occurred they might be amenable to vaccine treatment, and where this condition has

been fulfilled success has attended the treatment. Caseation, however, may be such an early event that ordinary surgical procedure must usually be necessitated. It is a question whether a certain number of recurrences of tubercular mischief might not be prevented by a post-operative course of vaccine treatment, and success been attained where recurrences have occurred or where the absence of early surgical interference has resulted in sinus formation; especially in these last cases a mixed infection is not infrequent, and here benefit has resulted from the use of a combined vaccine.

Tuberculosis of Bones and Joints.—The results recorded here are meagre, and little can be said regarding them. There is one point relating to synovial tuberculosis to which reference may be made. Caseation with the accompanying danger of interning of tubercle bacilli is frequently a much later event than in tuberculosis of lymphatic glands, a very great thickening of synovial membrane being possible with a minimum of caseation. In such circumstances the tubercle bacilli are probably more accessible to the antibacterial capacities of the body fluids. This may be a factor in the success which frequently attends the immobilisation of a tuberculous joint, and a plea might be put forward for the application of vaccine therapy during periods when rest is the main treatment in use.

Lupus.—In 21 cases of this disease, collected by Carmalt Jones² at St. Mary's Hospital, 3 were cured, 17 were improved, and 1 was unchanged, and it must be left to the future to determine whether vaccine therapy manifests advantage over ordinary methods of treatment.

To sum up, with regard to tuberculosis, there is considerable evidence that early cases before caseation has occurred tend to yield under vaccine therapy to a greater degree than to ordinary treatment. Further, where tubercular ulceration occurs under such circumstances that the body fluids can readily pass through the zone of bacterial invasion (this being the condition in many cases of phthisis) good results are obtained, but where bacilli are locked up by caseation vaccine therapy will probably have little effect. The vaccine treatment has been applied with striking success in old-standing, semi-quiescent tuberculosis, especially where complete removal of the focus by ordinary methods is impracticable, and certain apparently desperate cases of this kind, for example disorganising tuberculosis of joints, have yielded in a surprising fashion.

Non-Tubercular Infections of Urinary Tract.—These may be caused by a variety of organisms, and every case must be investigated by the bacteriological examination of urine obtained with all aseptic precautions. When the organism probably causing the condition is isolated an autogenous vaccine must be prepared and carefully applied in small initial doses of from 20 to 30 million bacteria. The results obtained are often very striking, especially in cases which have not had a very long duration, and even in long-standing cases which have resisted ordinary treatment the symptoms have yielded in a short time. It is to be noted, however, as a very general experience that even after the symptoms have disappeared a bacilluria may still persist. Infections of the urinary tract well illustrate the fact that even the observer with the widest experience has as yet insufficient ground for maintaining towards vaccine therapy any other attitude than one of reserve.

The most acute diseases have been attacked by the vaccine methods, and three examples of the results obtained may be mentioned.

Pneumonia.—A number of observations have been made in this disease. Willcox and Morgan⁹ treated 43 cases with doses of from 20 to 30 million pneumococci, the dose being repeated every 24 to 48 hours if necessary. The treatment may be commenced with a stock vaccine until the autogenous vaccine, which apparently gives better results, can be prepared. One result observed was the early occurrence of a crisis, this coming on in 6 cases from the 2nd to the 5th day. Another point was that in a third of the cases the fever fell by lysis. Of the 43 cases only one died.

Leary¹⁰ has used the treatment in 83 cases spread over three years, the dosage being similar to that already given. The effect was a moderation in the clinical symptoms, and the death-rate was 9.7 per cent. In 16 cases treated by Egbert and O'Neill,¹¹ 8 of which were double pneumonias, similar results are recorded, only 1 of the 16 being fatal. Out of 155 cases collected by Stoner³ 135 recovered, and as Musser and Norris¹² state that the average mortality in pneumonia is about 21 per cent., there is considerable ground for advocating further observations being made in this disease.

Typhoid Fever.—The vaccine method has been applied in the treatment of this disease. Leishman¹³ and Smallman² recommended the administration of 100 million bacilli, that is, one-fifth of the first dose given in prophylactic work in typhoid fever. If

the temperature shewed a tendency to fall the dose could be repeated every four days. According to Leishman's latest report¹³ encouraging results have been obtained. A series of 30 cases were treated by Waters and Eaton¹⁴ along similar lines, 25 to 50 million bacteria being used. From an inspection of the charts it is evident that the fall of the temperature did not take place much earlier than in ordinary cases, and that thus little effect was produced. Richardson's¹⁵ results were similar, but, comparing treated with untreated cases, he came to the conclusion that in the former relapse was less frequent. The relative want of success met with by the last observers may be due to the small doses used. The vaccine treatment has been applied with a view to the cure of typhoid "carriers," but although one or two cases are stated to have given a good result, usually no effect has been produced.

Erysipelas.—A noteworthy series of observations on this disease is given by Ross and Johnston.¹⁶ Although the numbers are not large, the value of the work lies in the comparison of 19 cases treated by ordinary methods with the succeeding 19 treated by vaccination. In the former the average duration of the illness was 25 days, and in the latter 12·8 days. The average stay in hospital in the non-treated cases was 18 days, and in the vaccinated 11·2. There was thus evidence that the duration of illness was lessened by the treatment, and that this had effect was also shown by the fact that in 6 of the untreated cases complications occurred in comparison to one such event in the vaccinated cases. With regard to *dosage*, in ordinary cases the initial dose was 20 millions, followed by 10 millions, on the succeeding day. In severe cases the initial dose was 10 millions, succeeded by 5 millions on the 2nd day. The treatment was maintained by inoculations on alternate days till the temperature was normal.

From what has been said it will be gathered that the application of vaccine therapy is limited by three chief factors:—*First*, the limitation of the capacity for antibacterial response in the human body; *second*, the existence of individual peculiarities of disease manifestations; and *third*, by the fact that we are still in the dark as to the means to be adopted for bringing out an antibacterial response in its highest degree.

With regard to the conditions favourable to the action of vaccines, what has been said regarding tuberculosis applies very generally. The essential point is that the body fluids containing antibacterial substances must have free access to the focus of infection. The non-existence of this condition explains much of

the want of success which has attended the treatment. In tuberculosis we have the interning of the bacilli, and in many conditions we have the bacilli multiplying on free surfaces of the body or in such situations as are really inaccessible to the body fluids. In cases of coli infection of the bladder this probably explains the bacilluria persisting after symptoms have disappeared, and it also explains the failure of vaccine therapy to affect an acute gonorrhœa or the multiplication of the typhoid bacilli in "carrier" cases. It is to be noted that in many cases the access of antibodies to the bacteria can be favoured by associated procedures, familiar examples of which are the opening of an abscess, laparotomy in tuberculous peritonitis, massage, and in certain cases probably the diminution in the coagulability of the blood by the exhibition of organic acids, as has been recommended by Wright.¹

A serious difficulty, however, is that in vaccine therapy practice is in advance of scientific knowledge. Whilst the application of vaccines has followed from the facts ascertained regarding immunisation responses in animals, we are hampered by our want of knowledge regarding the substances in the bacterial protoplasm which stimulate reactive mechanisms in the body. The success, however, which has attended the treatment of such conditions as furunculosis, and regarding which all are agreed, is such as to suggest that when further knowledge regarding the pathology of infection is attained a similar success may follow the treatment of other diseases.

We may sum up by stating that a case has been made out for further observation. The present situation is not final, but if advance is to be made certain conditions must be fulfilled. The most important of these is that every vaccine procedure must be looked upon as of the nature of a scientific experiment, often of a prolonged and tedious character, and unless this be clearly recognised the new therapeutic procedures can never have a fair trial. The fulfilment of this condition necessitates on the part of anyone applying the method a mastery of the elementary underlying principles, the most essential of which is that no hard and fast rule of dosage can be laid down as applicable to cases presenting a clinical similarity. Here it may be laid down as a general principle that in ordinary acute infections the initial dose ought to be limited to a few millions, while in more chronic cases 50 or 100 millions may be used, but the essential point is that the effect of every single dose must be carefully watched. The mere fact that so often it is necessary to employ a vaccine made from the actual strain

of bacilli responsible for the individual infection being treated accentuates the necessity for every vaccination being considered by itself. A similar principle is true of the interspacing of the doses. The best interspace must be determined for every case. Vaccine therapy more than any therapeutic method recently introduced has suffered from the indiscriminate use of its weapons by those who have taken no trouble to acquire a knowledge of their character.

A serious difficulty of the situation is the fact that so few possess as yet an extended experience such as may guide them in undertaking vaccine work, and while the development of further specialisation in medicine is to be regretted, it may be laid down as a general principle that in all serious cases where vaccination is applied special knowledge is necessary if the best interests of the patient are consulted.

There is one further remark I would make in concluding. There has been a tendency in certain quarters to apply vaccine treatment indiscriminately to disease whether or not there is any scientific ground for supposing that the condition present is of bacterial origin. Apparent success following the administration of a few doses of a vaccine prepared from a supposed causal organism has even been taken as evidence that the organism really has a causal connection with the disease. If what has been said regarding the difficulty under any circumstances of attributing clinical improvement to the use of a vaccine has been appreciated the crass empiricism of such a procedure will be evident. Action of this kind will discredit not so much vaccine therapy as the whole practice of medicine.

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CLINICAL RECORD.**DERMOID CYST OF NECK WITH UNUSUAL CONTENTS.**

By J. W. STRUTHERS, F.R.C.S.,
Assistant Surgeon to the Royal Infirmary.

MRS. E. M., aged 42 years, was admitted to the Royal Infirmary on 8th September 1911 for treatment of a large swelling in the neck. The appearance presented by the swelling is well shown in the accompanying photograph (Fig. 1).

The patient stated that it had first appeared as a small inconspicuous nodule when she was 12 years old, and had remained in that condition till about 3 months before she applied for treatment, when it began to enlarge and continued to grow till her admission to the Infirmary. It had never caused pain, and did not interfere with swallowing or respiration.

On examination the swelling was found to present the characters of a tensely-filled cyst. It was not adherent to the skin, did not bulge into the mouth, and did not move appreciably with the larynx in swallowing. From its position and the history of its slow development it was inferred that the cyst had developed from an unobliterated portion of the thyro-glossal duct or was a dermoid cyst growing from a sequestered portion of epidermis.

Local anæsthesia was used in its removal, and was induced by injecting subcutaneously about 3 ounces of a half per cent. novocain adrenalin solution round the base of the swelling, as completely as possible below it and along the line of the proposed incision across its convexity. The cyst, with an elliptical piece of skin, was easily dissected out. It was found to lie posteriorly on the thyro-hyoid membrane, but was readily separated by blunt dissection, and had no pedicle of any kind. After hardening in formalin it was cut across, and found to be a very thin-walled cyst containing turbid fluid and ten ovoid flattened concretions varying in length from half an inch to one and a half inches. These were white in colour, smooth on the surface, and exceedingly soft, so that their smooth surface was partly destroyed in mounting them. In order to prevent them breaking up altogether they were soaked in glycerine jelly, fixed to the side of a jar by the same medium, and mounted in the ordinary preserving fluid (Fig. 2). Dr. Shennan, who kindly examined sections of the cyst wall, reported that it was probably a dermoid cyst. The lining showed squamous epithelium but no glands or hair follicles. The concretions were composed of desquamated epithelial cells. The occurrence of such concretions appears to be very unusual, and is a feature of special interest in the case.



FIG. 1.

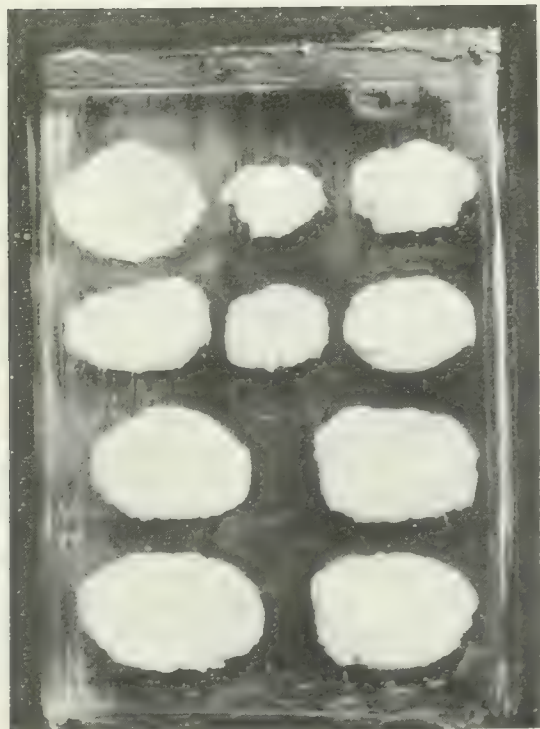


FIG. 2.

MEETINGS OF SOCIETIES.

Scottish Otological and Laryngological Society.

THE third meeting was held at the Royal Infirmary, Edinburgh, on Saturday, 25th November, under the chairmanship of Dr. J. Malcolm Farquharson.

Dr. Farquharson showed a patient, a man aged 72, suffering from *epithelioma of the laryngo-pharynx*. There is a large growth in the right pyriform fossa. The chief interest in the case lies in the laryngeal appearance. Though there are no laryngeal symptoms there is marked redness and swelling of the left ventricular band, entirely concealing the left cord. This disappeared to a certain extent on sedative treatment, but the left ventricular band still hides a good portion of the cord. It is probable that the laryngeal condition is due to torsion caused by the growth.

Dr. Farquharson also reported a case of *primary nasal syphilis*. The chancre appeared in the floor of the vestibule of the right nostril. It was followed by severe œdema of the whole nose, of the malar regions and of the eyelids, and enlargement of the submaxillary, sublingual, and preauricular glands. An injection of "606" was given. Fourteen days later Wassermann's reaction, which had been positive, was negative, and at the end of six weeks all œdema and induration had disappeared.

Dr. G. T. Guild showed a woman on whom he had, eight years ago, performed *thyrotomy for lupus of the larynx*. Severe dyspnoea had made this necessary. The result was most satisfactory, and the patient has required no further treatment. She speaks well, and there is no interference with breathing.

Dr. W. G. Porter showed—1. A case of suspected *inflammation of the mastoid process illustrating the diagnostic value of a skiagram*. The patient had suffered from acute middle-ear suppuration. The discharge from the ear had ceased, but there remained œdema and tenderness over the mastoid: temperature, 100° F.: leucocyte count, 16,800. A skiagram of the mastoid was taken, but before it was developed the mastoid cells were opened and were found healthy. The skiagram was then developed, and showed a condition in accord with that found on operation.

A discussion took place as to the value to be placed on skiagraphy of the mastoid process, the general opinion being expressed by Dr. Thomas Barr that, while it was of some help, chief reliance should be placed on the clinical phenomena.

2. A woman with *caries involving the soft palate, the left tonsil, and the*

left pharyngeal wall. A large mass of tortuous veins is seen on the uvula, left tonsil, posterior pillar, left side of soft palate, and the left lateral wall of the pharynx, but it does not extend into the larynx or naso-pharynx. The condition has been present for sixteen years at least, and causes a choking sensation, especially when she stoops. There has been no hæmorrhage. She has also a small angioma on the left little finger, and several members of her family have suffered from varicose veins. The opinion of the members was asked as to treatment.

Drs. Brown Kelly, Walker Downie, and Farquharson referred to similar cases which had come under their observation, the latter recommending the use of X-rays and carbon dioxide snow, which was also recommended by Dr. Milligan.

Active surgical interference was deemed inadvisable.

3. A case of *chronic pneumococcal ulceration of the pharynx, tonsils, and tongue.*

When first seen in January this boy had small superficial ulcers on both tonsils and on the pharyngeal wall, and also small opalescent patches not unlike mucous patches. The cervical glands were enlarged. Active anti-syphilitic treatment was adopted, but without result, indeed the ulceration continued to spread. A swab from the throat on two separate occasions, with a month's interval, gave a pure culture of pneumococci. Pneumococcal vaccine was injected, twelve doses being given, and local antiseptic treatment was continued, but the course of the disease was not influenced. The condition fluctuated up till September, when he was sent to the country. After a fortnight's visit the ulceration rapidly healed, and at the present time there is no sign of recurrence, though there is some hoarseness due to laryngitis.

Dr. Logan Turner showed—1. A patient on whom he had operated for *chronic middle-ear and labyrinthine suppuration, complicated by sigmoid sinus thrombosis and septic lepto-meningitis.* The patient, a woman aged 31, had had discharge from her right ear for three years. When admitted to hospital the tests pointed to involvement of the labyrinth as well as of the middle ear. She had had severe headache, she looked ill, and she had a rigor on being put to bed. Lumbar puncture gave exit to cerebro-spinal fluid under very considerable pressure, but it was not turbid. The radical mastoid operation was followed immediately by double vestibulotomy, and the internal auditory meatus was opened, permitting the escape of cerebro-spinal fluid. Three days later the internal jugular was tied and the lateral sinus opened. The fluid from the sinus gave a diplococcus resembling pneumococcus and bacillus proteus; from the cerebro-spinal fluid, streptococcus pyogenes and staphylococcus albus were obtained; and from the mastoid, bacillus proteus and streptococcus pyogenes. Vaccines of the streptococcus and of the bacillus proteus were given on alternate evenings—ten doses

in all. The patient improved, but again relapsed, the symptoms of meningitis reappearing. Lumbar puncture was performed on several occasions, and as the streptococcus had disappeared from the spinal fluid, a staphylococcus vaccine was given daily. After six weeks the patient made a complete recovery.

This case gave rise to a good deal of discussion, in which Drs. Adam, Milligan, Stoddart Barr, and Syme took part, and which turned on the subjects of otogenous meningitis, the indications for opening the labyrinth at the time of the radical mastoid operation, and the value of vaccine treatment. As Dr. Turner remarked, any one of these was worthy of a full and extended discussion which the Society might on a future occasion consider.

2. A patient, a man aged 53, one year and eight months after *thyrotomy for epithelioma* of the right vocal cord and the anterior third of the left. Though the man can now only speak in a whisper there is no sign of recurrence.

3. A boy, aged 7, from whose right bronchus he had *removed a toy metal pipe by direct upper bronchoscopy* under chloroform. A skiagram and the foreign body were shown. The accident had occurred five weeks before removal. Dr. Milligan showed a large pebble which he had removed from the bronchus of a man by a similar method.

Drs. Logan Turner and J. S. Fraser showed two *cases for diagnosis*. In one there was ulceration of the palate with pus and granulations in the right nasal cavity; in the other case there was a large swelling of the left ary-epiglottidean fold, and in him there were signs of congenital syphilis. In both von Pirquet's reaction was positive and Wassermann's negative, but in spite of this the condition in both was thought to be specific.

Dr. Fraser gave a lantern demonstration of *injury to the ear in two cases of fracture of the base of the skull*.

Drs. J. S. Fraser and J. K. Milne Dickie contributed an *analysis of 123 consecutive cases in which operations were performed for the relief of the mastoid, labyrinthine, and intracranial complications of suppurative middle-ear disease*. Of these the ear disease was acute in 32, chronic in 78, tubercular in 12, and malignant in 1. Intracranial complications were present in 13. In two of these, cases of lateral sinus thrombosis, operation on the sinus led to recovery. In four cases the labyrinth was successfully operated on.

The analysis of these 123 cases was most full and interesting, and the many points raised gave rise to a prolonged discussion in which many members took part. Drs. Fraser and Dickie were specially thanked for the great trouble they had taken to present their report to the Society.

Dr. Kerr Love showed—1. A brain and stereograms illustrating a case of *temporo-sphenoidal abscess*.

The patient, a man aged 49, had had discharge from his left ear for years. Fourteen days before admission to hospital he had fallen on the right side of his head. Severe headache followed, and five days before admission he became semi-conscious. At the operation the tegmen tympani was sloughy, and there was an extra-dural collection of pus. The dura was incised, and a temporo-sphenoidal abscess evacuated. At the post-mortem basal meningitis was found, and the abscess had ruptured into the lateral ventricle.

2. *Stereograms* of a case of malignant disease of the auricle, parotid gland, and pterygoid fossa.

The growth began in June as a small nodule behind the lower part of the left ear, and had rapidly increased in size. The growth and gland were removed. The middle ear and the jaw were not involved.

Drs. Logan Turner and Porter gave a most interesting *demonstration of skiagrams* of cases of naso-antral (choanal) polypus, cases of dental cyst, and a case of mucocele of the frontal sinus. They also showed stereoscopic views of the skull.

It was arranged to hold the next meeting in May, at the Royal Infirmary, Glasgow, under the chairmanship of Dr. Kerr Love.

Dr. W. S. Syme, Glasgow, was reappointed Hon. Secretary and Treasurer for 1911-1912.

Edinburgh Medico-Chirurgical Society.

A MEETING was held on 29th November, Mr. J. M. Cotterill, President, in the chair.

Dr. John Eason showed photographs of a patient suffering from gout. A clinical record of the case appeared in the *Journal* for December 1911, page 537. Dr. Eason also showed photographs of a case of symmetrical lipomatosis.

Dr. Chalmers Watson showed specimens from a case of glossitis and general systemic infection with *saccharomyces albicans*.

Mr. Stiles showed a child with double congenital dislocation of the hip. There was great backward as well as upward displacement and marked lordosis, so that the gait was very unusual.

Dr. William Russell read a paper, illustrated with lantern slides, on the "Position of the Stomach as a Guide to Pyloric or Duodenal Difficulty," which appears on page 34.

Dr. Chalmers Watson held that hyperchlorhydria was a dyscrasia of toxic or metabolic origin rather than a clinical entity. Interval pain, relieved by the taking of food, was common where there was no excess of acid. He thought the ordinary methods of examination were of little value compared to the results of X-ray examination.

Dr. Fowler referred to cases of dilatation in children between the

ages of 3 and 10, and asked whether there was any evidence that such cases were due to congenital hypertrophy of the pylorus.

Dr. Gulland said that the right border of the stomach was often displaced to the right although there was no pyloric or duodenal stenosis. He agreed with Dr. Russell that hyperchlorhydria was a clinical entity, and that the ordinary methods of examination gave more accurate results than examination with the X-rays.

Professor Caird pointed out that the surgeon often found the stomach differed from the description given by the physician because it had been washed out and had contracted prior to operation. In operations for perforated ulcer the stomach was very commonly found as the physician had stated it to be.

Mr. Miles said that his experience of these cases was that there was not much displacement of the pylorus, but that the anterior wall of the stomach got folded over it to the right.

Dr. W. T. Ritchie said he preferred simple percussion after inflation to auscultatory percussion in determining the size of the stomach, but that probably the X-ray examination was superior to both.

Mr. Stiles said he had been more deceived by the radiographer than by the physician. Stereograms were taken when the stomach was not in the position seen by clinical methods. The important point was whether the stomach could empty itself. If it could not, then gastro-enterostomy should be done and the pylorus closed.

Dr. Russell in replying to the discussion insisted on the value of succussion in mapping out the stomach. The cases he was referring to were cases in which the right border could not be got back by medical treatment, and in those the physical defect had to be met by physical means.

Dr. James Ritchie read a paper introducing a discussion on Vaccine Therapy, which appears on page 38. The discussion was adjourned to the next meeting.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—At a meeting of the College, held on the 15th December, the following gentlemen, having passed the requisite examinations, were elected Fellows :—William Beggs, M.D., C.M., Edinburgh ; Harry Slater Cormack, M.B., Ch.B., Lieutenant, Indian Medical Service, Corstorphine ; George Augustus Davies, M.D., etc., Musselburgh ; M. J. Jinadasa, L.R.C.S.E., etc., Ceylon ; Josiah Howard Lawry, M.B., Ch.B., New Zealand ; Stanley Gordon Luker, Bac. Surg., Univ. Camb., London ; William Crawford Macknight, M.B., C.M., New Zealand ; John Mitchell, M.B., Ch.B., Old Rayne, Aberdeenshire ; David Munro, M.B., Ch.B., Captain, Indian Medical Service ; James Charles Stewart Oxley, M.R.C.S. (Eng.), L.R.C.P. (Lond.), Captain, Indian Medical Service ; Daniel Richmond, M.D., etc., Rochdale ; Hermann Melchior Robertson, M.D., C.M., M.R.C.S. (Eng.), British Columbia ; John William Robertson, M.B., Ch.B., Arbroath ; Edwin Charles Temple Smith, M.R.C.S. (Eng.), M.B., Ch.B., etc., North Queensland ; Charles Stiebel, M.R.C.S. (Eng.), M.B., etc., London ; and Norman Burke Taylor, M.B., Toronto.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

By W. T. RITCHIE, M.D., F.R.C.P.,
Assistant-Physician to the Royal Infirmary.

DIABETIC COMA.

ACIDOSIS is defined by Magnus-Levy as the accumulation of acids in the body, brought on in each case by disturbance of oxidation. The acetone bodies, including oxybutyric acid, aceto-acetic acid, and acetone, are temporarily formed in almost all diseases and in starvation, but there is an important difference between diabetic and non-diabetic acidosis. In the latter the elimination of acetone bodies rarely exceeds 10 or 15 grms., and when such quantities appear in the urine they do so for only a short time. In diabetes an elimination exceeding 30 or 40 grms. may persist for months or years. The human organism as well as that of carnivorous animals defends itself against the action of accumulated acids by forming ammonia. A diabetic patient has at any time 6 or 8 grms. of ammonia at his disposal, and consequently 40 or 50 grms. of oxybutyric acid can be eliminated month after month without acidosis becoming harmful. A fatal acid intoxication will only occur when the accumulation of acids reaches twice or thrice that amount. Stadelmann was the first to regard diabetic coma as a fatal acid intoxication. He compared it to the experimental poisoning of animals with hydrochloric acid. Magnus-Levy criticises the objections that have been raised against the validity of this comparison, and argues that they are ill founded. It is indeed true that only a few cases are known in which advanced diabetic coma has disappeared under the use of bicarbonate of soda, whereas alkalies are absolutely efficacious in experimental acid poisoning. In diabetic coma, however, the formation of acids does not stop for a moment, and moreover the acids are produced in the cells themselves, only a small fraction of the total quantity entering the blood.

Acetone and the allied acids do not originate from carbohydrates, but from fats and proteins. The ingestion of fat, however, is not followed by increased output of acetone, and a diabetic patient should be given a sufficient supply of fat to maintain or even increase his weight. Butter is an exception to this general rule, because of its richness in glyceryls of butyric acid. The endeavour to avoid those foodstuffs which may form oxybutyric acid is useless, since protein and fat each

do so. Alcohol and sugar are the only materials which do not yield acetone bodies. We ought rather to look for anti-ketogenic (anti-ketonuric) substances, which diminish acidosis by increasing the splitting and combustion of the acetone bodies. The carbohydrates exert the strongest anti-ketonuric effect, but sugar, which in a healthy man can dissipate a strong acidosis induced by starvation or by excessive animal food, is not available for the diabetic patient. The preformed carbohydrates of the food are anti-ketonuric, and likewise glycerine, but the sugar formed from glycerine is eliminated in severe diabetes, and thus cannot be used for the oxidation of the acetone bodies. Most other substances, such as gluconic acid, known to be anti-ketonuric are not foodstuffs, and therefore cannot be employed permanently. Alcohol, however, does materially decrease the amount of acetone bodies in the urine, and Magnus-Levy regards the administration of alcohol as most desirable in cases of diabetic coma. Bicarbonate of soda, which is so beneficial as a palliative remedy, does not act directly against the diabetic acidosis, neither does it diminish the formation of acetone bodies, nor does it favour their combustion.

Castriota contributes a paper on the action of anti-glycosuric sera. His experiments were conducted on rabbits. The serum was capable of checking the glycosuria induced by phloridzin, adrenalin, or morphia.

Diabetic coma was one of the subjects for discussion at the French Congress of Medicine held at Lyons in October 1911. So many of the speakers dissented from the usually accepted theory which ascribes this fatal termination of diabetes mellitus to acid intoxication that, as M. Marcel Labbé said, this theory underwent *un mauvais quart d'heure*. M. R. Lépine (Lyons), in opening the discussion, said he had used intravenous injections of sodium bicarbonate since 1887, but his results had not been attended with any very striking success. He concluded that the acids in question are toxic, even when they are fully saturated by the soda, and that they rapidly induce irreparable lesions in the nerve cells. Alkaline treatment, in order to be successful, must be begun before coma sets in. The patient should be kept quiet, fats should be prohibited because they augment the acetonuria, and as much carbohydrate should be given as can be utilised by the patient.

MM. Hugouneq and Morel of Lyons, who spoke on the chemistry of diabetic coma, said that the acetone bodies are the intermediary physiological products of the intra-organic metabolism of fats. Proteins, which we now know are composed of many amino-acids, are ketogenic, whereas carbohydrates, glycerine, citric acid, and ethylic alcohol are anti-ketogenic. The toxicity of the acetone bodies is slight. In order to produce serious symptoms in man more than 90 grms. of β -oxybutyric acid, or 250 grms. of acetone, would be required.

Neither fats nor carbohydrates nor their derivatives are toxic, whereas substances containing a molecule of N are markedly toxic. In diabetes the protein metabolism is excessive, and it is the toxic action of protein derivatives that induces the coma. An analogy is seen in the experimental coma produced by Witte's peptone. The benefit obtainable from alkaline treatment cannot be regarded simply as due merely to saturation of acids, but may perhaps be explained on the supposition that oxidation is favoured and the patient's general resistance is increased.

M. Marcel Labbé (Paris) first gave an account of the symptoms and signs of the preliminary stage of acidosis. The probable onset of acidosis is indicated by acetomuria, its presence is revealed by the presence of aceto-acetic acid in the urine, and the intensity of acidosis can be gauged by the amount of oxybutyric acid that is excreted. The alkalinity of the blood becomes lessened, and lipæmia may be present. The symptoms of diabetic acidosis are inconstant. Among the more important are physical and psychical depression, headache, somnolence, vomiting, diarrhoea, abdominal pain, diminished excretion of urine and of glucose. The early recognition of acidosis is of great importance if treatment is to be successful. It is too late to wait until signs of coma appear. Large quantities of alkali should be given early. 20 to 40 grms. of sodium bicarbonate may be given daily for long periods. A teaspoonful of the bicarbonate may be given in milk or water every half hour. If one has to resort to intravenous injection for threatened coma, at least 40 grms. of bicarbonate should be given daily. In the dietetic treatment of diabetic acidosis Labbé recommends about 50 grms. of carbohydrate in the form of potato, green vegetables, or fruit, while the staple articles of diet are meat, eggs, fat (butter or olive oil) in large amount, and a pint of light wine. Anti-ketogenic substances may be tried. Among these mention is made of glutaric acid, which lessens the glycosuria and acetomuria of depancreatised dogs. Gluconic acid in doses of 30 to 100 grms., glycerine, and xylose may exert an anti-ketogenic action in diabetes.

Blum (Strasburg) estimates the degree of acidosis in a simple manner, namely, by noting the reaction of the urine after administration of doses of sodium bicarbonate. The urine of a healthy man is rendered alkaline after he has taken 5 to 10 grms. of bicarbonate. In a case of mild acidosis 15 to 25 grms. may be required to produce this change of reaction, and in grave cases 150 grms. or more may be necessary. In cases of diabetic coma we must try to neutralise and to promote the elimination of acids, to aid their combustion and to delay their formation. Further, we must try to combat the cardiac and vaso-motor enfeeblement. Blum, therefore, allows no food containing much protein or fat, and considers that about two litres of milk should constitute the sole nourishment that is given. Dry champagne,

brandy, or wine ought to be administered. Bicarbonate is to be given in Vichy water every half hour. If there be any tendency to diarrhoea a little laudanum may be given. For intravenous injection a 5 to 6 per cent. solution of sodium bicarbonate is recommended. In cases of well-marked diabetic coma Blum has never seen recovery. The fatal issue cannot even be retarded.

In the discussion following Blum's paper Blumenthal (Berlin) expressed his opinion that acidosis is merely a subsidiary factor in the production of diabetic coma. Teissier (Lyons) and Maragliano (Genoa) regarded the coma as due to diminution of albuminoids in the blood. Rubino (Naples) and Mariani (Genoa) held that acidosis was not the important factor. Even if alkalies were useful in the premonitory stages, their administration must not be continued when coma is pronounced. Starvation, hot baths, and lavage of the blood should be tried. Taillens (Lausanne) recommends three or four litres of Vichy water to be taken in twenty-four hours, with nothing else except a little milk and a small quantity of alcohol well diluted.

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SURGERY.

By JAMES LOCHHEAD, M.D., F.R.C.S.

At the Third Congress of the International Society of Surgery, held at Brussels, 26th to 30th September 1911, the three subjects of discussion were:—The Diagnosis and Treatment of Pancreatitis; the Diagnosis and Treatment of Colitis; and Pleuro-Pulmonary Surgery.

PANCREATITIS: DIAGNOSIS AND TREATMENT.

The following classification was adopted:—Acute pancreatitis may be hemorrhagic, suppurative, or gangrenous, and these three types, according to Körte, differ only in the degree and the duration of the inflammatory process. Chronic pancreatitis may consist in sclerosis, lipomatosis, or lithiasis. The catarrhal inflammations of Mayo Robson, which are curable by operation before they become chronic, may also be included, but fat necrosis of the pancreas does not constitute a clinical entity.

Etiology.—Körte stated that nearly all the cases he had observed gave a history of prolonged epigastric pain, with convulsive exacerbations assigned often to gastric cramps, more rarely to duodenal ulcer or hepatic colic, but most frequently of all to the crises of cholelithiasis.

This, combined with the fact that gall stones were present in fifty per cent. of his cases, led him frequently to consider inflammation of the biliary passages as the cause of the acute pancreatitis. Delagenière was even more definite regarding the onset when he stated that acute pancreatitis nearly always supervened on chronic pancreatitis.

Pathology.—Doubt was cast on the existence of hæmorrhagic pancreatitis by Delagenière, who held that in almost every case the condition was a hematoma in the lesser sac resulting from a tear of the splenic vein, and not associated with any pancreatic lesion. Körte was, however, able to prove, from a large number of personally observed cases, that the initial pathological process was hæmorrhagic, and was followed by suppuration and necrosis. Compatible with this view is an interesting suggestion made by Reynaldo dos Santos that acute pancreatitis is at first embolic and not infective. Necrosis and peri-pancreatic suppuration may appear as early as the third or fourth day, but they are rare before the second week. In the fourth week they are frequent, and between the fifth and seventh weeks they are invariably present.

Diagnosis.—Even at the stage when there is a palpable swelling, the tumour shows nothing to suggest a pancreatic origin, except possibly when it causes an area of dullness between the stomach and colon. Dilatation of the stomach with effervescing powders may aid in localisation, but it entails a risk. Gobiet's sign, isolated dilatation of the transverse colon, is a manifestation of acute pancreatitis, and Körte attaches some importance to the presence of epigastric boarding. The pain of acute pancreatitis is characterised by its agonising intensity. It may radiate to the præcordia, and a spasm may be invoked by pressure in the costo-vertebral angle. The latter sign is not, however, pathognomonic, as it also occurs in embolism of the renal artery (Santos). Among the functional signs progressive emaciation, rapidly reaching an extreme degree, is of importance. Bulky stools containing an excess of fat, in the absence of jaundice or probable intestinal affection, indicate pancreatic disease. Loewy has shown that in pancreatics adrenalin dropped on the conjunctiva produces mydriasis.

Differential Diagnosis.—Hæmorrhagic pancreatitis takes one of three forms—fulminating, in which death takes place in a few hours; acute, in which death does not occur for three, six, or even fifteen days; and relapsing (Cabot), in which it is usually the third crisis that proves fatal. The last named is in reality a hæmatocele encysted most frequently in the lesser sac.

The diagnosis is usually made only when fat necrosis is seen at the operation. It has to be distinguished from sudden intestinal obstruction, in which the pain does not continue so intense and is not evoked by pressure in the costo-vertebral angle, the anemia is less marked, and the temperature is much lower; from peritonitis following a per-

foration in the stomach, duodenum, or gall-bladder, in which the boarding of the whole abdomen is marked; from tuberculous and appendicular peritonitis; and from obliteration of the mesenteric vessels. The relapsing type may be mistaken for hepatic or lead colic, gastric crises of tabes, and muco-membranous entero-colitis.

Suppurative pancreatitis may be a diffuse suppuration, in which the picture is more like peritonitis and less like intestinal obstruction, or a pancreatic abscess, in which the onset is slower, a well-defined tumour appears, emaciation and weakness are pronounced, and the temperature swings. As it grows the tumour may resemble an encysted pyo-pneumothorax, but more frequently it develops abdominally, and it is necessary to eliminate all other forms of left-sided posterior sub-phrenic abscess; or it may develop towards the lumbar region, and at the operation, undertaken for a renal tumour, the diagnosis is made by the appearances of the fluid. A relapsing form of suppurative pancreatitis is met with in which the symptoms are those of suppurative cholangitis. Finally, there is the gangrenous type with fat necrosis.

In the acute catarrhal pancreatitis of Mayo Robson there are transient glycosuria, steatorrhœa, and sudden attacks of violent pain coming on in the course of a toxæmia.

Chronic pancreatitis may be associated with biliary or intestinal disease, or it may be tuberculous, syphilitic, or associated with circulatory disturbance. The most important signs are rapid emaciation with jaundice and the character of the stools, which contain an excess of proteins, carbohydrates, fats, and water. The frequency of glycosuria was left undecided, and great diversity of opinion was expressed regarding the value of Cammidge's reaction. An increase in the diastatic power of the urine has been alleged. The differential diagnosis between chronic pancreatitis, cancer of the head of the pancreas, and stone in the common bile-duct is usually impossible.

Treatment.—Körte founded his conclusions on 44 cases of acute pancreatitis which he had observed—6 at autopsy and 38 operated on. In 4 cases the biliary passages were alone treated, and all died; in 34 the pancreas was directly dealt with, and 18 recovered. The results depended largely on the date of operation. Of 16 operated on during the first fortnight 11 recovered; of 14 during the second fortnight 7 recovered; of 4 between the fifth and seventh weeks none recovered. The difference in the mortality is due to the presence of suppuration or gangrene in the late cases.

Of the three proposed routes of approach to the pancreas the anterior abdominal is to be recommended, because it allows of examination and treatment of the biliary passages. The lumbar route is chosen only in a few rare cases of late operation for a retro-peritoneal collection, and the transpleural route for encysted collections in the

sub-phrenic space. Through the mesial abdominal incision the pancreas may be exposed either through an opening in the gastro-colic omentum or by the retro-duodenal route. During the early stages, when suppuration and gangrene have not yet developed, but the pancreas is swollen, firm, and congested, and exhibits foci of fat necrosis and effusions in the lesser sac, the pancreatic foci may be punctured at different points with a blunt instrument and drained. The collections are emptied, and provision is made for the escape of any pancreatic fragments that undergo necrosis. The gall-bladder must be examined and, if necessary, drained. If the stage of necrosis has been reached the foci are evacuated. Needless exploration, especially among the intestinal loops, is to be strongly condemned.

Complications. — The only grave post-operative complication is secondary hæmorrhage occurring after an interval of fifteen to thirty days. It is due to erosion of vessels in the necrotic foci, and is nearly always fatal. It is less likely to occur if operation is carried out at an early stage. Pancreatic fistule may form, but they tend to close spontaneously.

The treatment of chronic pancreatitis by cholecystostomy was unanimously praised.

PLEURO-PULMONARY SURGERY.

Pneumothorax. — Garré stated that the chief danger of operative pneumothorax arose, not from the exclusion of one lung, but from the flapping of the mediastinum, which led to a diminished gaseous exchange in the other lung. In a sudden crisis danger might be averted by fixing the mediastinum or drawing forward a lobe of the lung.

The introduction of differential pressure methods was bound to lead to vast extensions in thoracic surgery. The positive pressure methods departed more widely from the physiological, and theoretically their long-continued use in a feeble heart involved a risk, as the right ventricle was distended; yet in practice, with the careful management of Meltzer and Auer's apparatus, that risk has been shown to be insignificant.

The surgical treatment by resection of costal cartilages of rigid dilated thorax, associated with emphysema of the lung, was recommended. The suitable cases were those in which the cartilages were calcified and inelastic, and the thorax was fixed in the position of inspiration. It was not yet decided whether the pulmonary emphysema or the chondral condition was primary. The operation was useless in cases of rigid thorax due to hypertonicity of the respiratory muscles—in bronchitic and asthmatic dyspnoea, nervous and cardiac asthma. In otherwise suitable cases the operation was contra-indicated

if febrile bronchitis, bronchorrhœa, broncho-pneumonia, or bronchiectasis was present.

Acute Empyema.—Washing out of the pleural cavity, except in desperate cases, found only one supporter, Championnière, who used a solution of zinc chloride. The systematic use of suction drainage after pleurotomy received a considerable amount of support.

The chief discussion arose on the treatment of pneumococcal empyema. Gaudier favoured repeated aspiration of the pleural cavity with oxygen insufflation, and Dollinger stated that aspiration was quickly followed by death of the cocci and sterilisation of the pus. On the other hand Vanverts said that not more than one-third of the cases were cured by a single aspiration, and at each subsequent aspiration the condition of the patient was worse. Hence he advocated early opening and draining of the pleural cavity.

In tuberculous empyema the alternative lines of treatment suggested were repeated aspiration and pleurotomy without resection of a rib or after-drainage.

In any case of acute empyema, if operation was refused, 15 to 20 c.cm. of a 1 per cent. solution of collargol might be injected after each tapping (Gaudier).

Pleural Fistulæ.—Girard said that the outstanding cause of permanent fistulæ was mixed infection. Whether they were of tuberculous origin or not, the prognosis was grave if they were left to themselves. As regards non-operative treatment, injections of Beck's paste were considered dangerous, and respiratory gymnastics, which might effect a cure in the slight degrees of fistula, were chiefly indicated as an adjuvant to post-operative treatment.

For efficient treatment by operation emphasis was laid on the importance of determining the cause of the fistulæ, the dimensions of the suppurating cavity, and the condition of the lung and visceral pleura. For extensive shallow cavities Estlander's operation was recommended, and for large deep cavities Schede's operation. Girard and Lambotte favoured the combination of Schede's operation with decortication and mobilisation of the adherent lung. Ceci held that decortication was usually impossible owing to interstitial fibrous pneumonia, and when possible gave only a temporary expansion of the lung.

Wounds of the Pleura and Lung.—Lenormant said that wounds of the lung showed a great tendency to spontaneous cure. Of the immediate complications, in hemothorax the prognosis was usually favourable, and pneumothorax by inducing collapse of the lung was so efficient in stopping hemorrhage that it frequently was artificially produced. The closed and open varieties rarely caused trouble, but valvular pneumothorax was dangerous. Derjinsky showed from cases in the Russo-Japanese war that in gunshot wounds the bullet might cauterise its

track, and the most characteristic symptom of wound of the lung, blood in the sputum, might be absent.

The discussion resolved itself into a contrast between the classical or expectant treatment, and systematic, early intervention, and the general opinion leant towards the former. It was found impossible to lay down rigid rules for intervention in the presence of complications, but Baudet gave the least indefinite indications. He said immediate operation was indicated in cases of extreme gravity with death apparently imminent, in seemingly benign cases for infection or general emphysema, and in cases in which the danger was not immediate but arose from persistent or repeated hæmorrhage. Lejars favoured early operation in stab wounds as contrasted with gunshot wounds, and he was supported by Championnière. The operation mortality in stab wounds was 25 per cent., and in gunshot wounds 50 per cent.

The importance of keeping the patient at rest in bed for a prolonged period was emphasised—fifteen to twenty days in medium cases, and six weeks in grave cases.

By the expectant treatment the statistics of 1056 cases showed 90 per cent. of recoveries; of the deaths two-thirds were due to hæmorrhage and one-third to sepsis. Differences of opinion arose as to the indications for operative interference in grave hæmorrhage, but the opinion was universally held that if the wounds of the lung were surgically treated the pleural cavity should be closed without drainage.

Pulmonary Tuberculosis.—Friedrich laid down the following rules regarding resection of the ribs for pulmonary tuberculosis:—

The operation was to be recommended in fibrino-cavernous cases, especially of one-sided phthisis not acute in its progress, in patients still strong and between fifteen and forty years of age.

It was specially indicated when the tendency to contraction or flattening of the affected side, narrowing of the intercostal spaces, or displacement of the mediastinum or diaphragm was evident.

It was not contra-indicated by pleural adhesions or by the presence of slight, old foci in the other lung, but it was contra-indicated in metastatic disease of the larynx, intestine, and bones, and in extensive infiltrating processes in the lung.

The choice between complete thoracoplasty with pleuro-pneumolysis, partial resection of ribs, and operation in several stages depended on the careful estimation of each patient's strength and cardiac activity.

In all cases that survived the operation there was a notable improvement.

Discussions were also held on parasites and tumours of the lung, on pulmonary abscess and gangrene, and on bronchiectasis. The last named was characterised as the least profitable of all lesions for surgical intervention, mainly owing to the multiplicity of the bronchiectatic cavities.

MIDWIFERY AND GYNECOLOGY.

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THE TIME RELATION BETWEEN OVULATION AND MENSTRUATION.

FRAENKEL of Breslau, who has done so much work on the function of the ovary and corpus luteum, discusses this question of the relation between ovulation and menstruation in the light of fresh material he has collected (*Zentralb. f. Gynäk*, No. 46, 1911). The elucidation of the problem has a practical as well as theoretical interest, for instance in the determination of the exact duration of pregnancy in the human subject, the most likely time for fertilisation to occur, and the explanation of the symptom of "mettelschmerz." There is still a great deal of difference of opinion regarding the relationship, and at present three views are held—1. There is no relation between menstruation and ovulation. 2. There is a relation, but the two do not occur at the same time. 3. Ovulation and menstruation occur at the same time.

The means of investigating the subject are limited, as animals cannot be used, post-mortem material is fallacious owing to the influence on both functions of the disease causing death, and the investigation of ovaries removed at operation is of no use, as such ovaries are pathological. The method Fraenkel has employed is the routine examination of the ovaries in cases where the abdomen has been opened for some pathological condition in organs other than the genitals. For the purposes of the investigation any case where there was the slightest involvement of the uterus, tube, ovaries, or cellular tissue of the pelvis was rejected. He had previously recorded his findings in ninety-five cases, and now adds to those other thirty-eight. Ten were operated on during menstruation, and in no case was a recent corpus luteum found in the ovaries. He therefore concludes that ovulation and menstruation do not necessarily occur at the same time. (A recent corpus luteum is easily recognised by its prominence in the surface of the ovary, the ease with which it bleeds, its bright red colour, and its softness.) In forty-three of the cases such a recent corpus luteum was found, and the time elapsing between the onset of the last menstruation and the date of operation varied from eleven to twenty six days the average being eighteen days. In other words there was evidence of recent ovulation having occurred somewhere about ten days before the expected onset of the next period. (The actual onset of the next period has of course to be neglected, as the operation nearly always

disturbs it, so it is necessary to reckon from the immediately preceding period.)

Fraenkel therefore concludes that ovulation and menstruation do not occur at the same time, but that ovulation and the formation of the corpus luteum go on during the second half of the intermenstrual interval. While the two functions are not synchronous, the one has a profound influence on the other, for, according to Fraenkel, it is the intimal secretion of the recent corpus luteum which determines the premenstrual and pregravid changes in the uterine mucosa.

THE PRELIMINARY PLACING OF THE PERINEAL STITCH IN LABOUR.

The immediate repair of a badly lacerated perineum after labour is not always an easy matter, and in the absence of a good light and some assistance can seldom be done thoroughly efficiently, that is, in such a way as to ensure not only apposition of the skin and vaginal wall surfaces but also of the separated levator ani muscles. Without the last, the ultimate result as regards subsequent prolapse cannot be good. Laphom Smith (*Amer. Journ. Obstet.*, October 1911) gives his experience of his method of placing the sutures before the birth of the child, a method which he originally wrote on in 1904, and which he has used for the past twenty years.

Just before the child's head comes down on the perineum the patient is anaesthetised and the hips are brought across the bed. The perineum is sterilised with a brush and antiseptics. The thumb of the left hand is introduced into the anus and the forefinger into the vagina. With the right hand a long curved perineal needle is entered at the base of the labium minus on the patient's left. It takes in the levator ani muscle, and is then passed just under the vaginal wall to emerge at a corresponding point on the other side. A silkworm gut suture is threaded into it, the suture drawn through, and the two ends secured with forceps. A second suture is introduced in the same way about an inch further back taking in the perineal muscles. If there is reason to suppose that the tear may be a bad one a third suture may be introduced which catches up the sphincter ani muscle on each side of the middle line. The ends of the sutures are held with forceps and the labour allowed to proceed or is terminated artificially. After delivery of the placenta the perineum is inspected, cleansed of all blood clot, and if a tear is present the sutures are tied from above downwards. Those not required are simply withdrawn.

The loose sutures offer no obstacle to natural or artificial delivery. If any laceration occurs the surfaces are brought into accurate apposition and the muscles of the pelvic floor are prevented from retracting. If this method of treatment be carried out there will be very little of that slight rise of temperature and pulse on the second or third day so

often met with in cases where a laceration has not been properly attended to. In cases of complete tear there will be accurate apposition of the two ends of the torn sphincter, and in all cases the chances of a subsequent prolapse are greatly minimised.

DUDLEY'S OPERATION FOR DYSMENORRHOEA AND STERILITY.

Brickner (*Surg. Gyn. and Obstet.*, November 1911) gives an account of this operation as he practises it and of the ultimate results in 73 cases which he has been able to trace out of a total of 106 on which he had operated. The class of case in which the operation is justified is that presenting one or both of the symptoms above mentioned associated with narrow conical cervix and acute congenital ante flexion or retro flexion of the uterus. Slight congenital hypoplasia of the uterus is not a contra-indication. In all cases before the operation is undertaken for sterility the husband ought to be examined for the presence of living spermatozoa in the semen. Previous inflammatory affections in the pelvic organs or the presence there of gross disease are contra-indications. It is by inattention to the selection of suitable cases that many operators have been lead to condemn the operation.

The technique is very simple. The cervix is fully dilated with graduated dilators, and, as there is usually some glandular hyperplasia present, the uterus is curetted. With scissors the cervix is then split up the middle line posteriorly as far as the vaginal roof, and with a knife an incision through the internal os is made on the cervical canal aspect. A wedge-shaped piece of tissue is removed from each side of the incised posterior lip, and sutures inserted so as to fold each cut surface on itself and so bring the external os up to the angle of incision. In this way the external os is displaced backwards, and, instead of lying against the anterior vaginal wall as in extreme cases of ante flexion, it is directed towards the posterior wall. In this position the access of semen to the uterus is rendered more likely. At the same time the acute curvature of the uterine and cervical canals is done away with and the axis straightened.

As regards results Brickner's statistics show a curious difference between hospital and private patients. Of his 73 cases, 52 were hospital and 21 private patients. Taking the two together he finds that in 64 per cent. the dysmenorrhœa was relieved, and in 27 per cent. the sterility overcome. Of the private patients alone, 84 per cent. were cured of dysmenorrhœa and 42 per cent. of sterility, while among the hospital cases only 55 per cent. were cured of dysmenorrhœa and 17 per cent. of sterility. It is a little difficult to account for this difference in results, but taken all over they quite justify the operation in properly selected cases.

There is, as a rule, no difficulty with labour after the operation. Brickner has delivered seven of the cases on which he operated, and in all the cervix dilated quite satisfactorily.

THE CAUSES OF HÆMORRHAGE IN THE NEW-BORN CHILD.

Bonnair and Durante (*L'Obstét.*, October 1911) record four cases of fatal hæmorrhage from the liver which they had the opportunity of examining. The cases occurred within a very short time of each other, and a number of other cases with slighter degrees of hæmorrhage in various situations came under their observation at the same time. This "epidemic" character of the condition led them to make a thorough investigation. In all the cases there was evidence that there had been hæmorrhage into the liver before the birth of the child, and in the liver there was evidence of cell degeneration and vascular changes. The fatal bleeding occurring after birth was due to the rupture of a hæmatoma under the liver capsule into the peritoneal cavity. In three of the cases a Gram-positive non-capsulated diplococcus was found.

They come to the conclusion that the hæmorrhages are due to an active infective or toxic condition, transmitted from the mother or acquired after birth, acting on a liver previously damaged by some chronic process such as syphilis or the toxins met with in eclamptic mothers. Traumatism at birth is rarely the only cause, but slight traumatism when the liver is so altered may result in extensive bleeding. The changes on the liver seem to result in a lowered coagulability of the blood, and it is not unusual to find in these cases evidence of hæmorrhages in other situations producing cephalhæmatoma and bleeding from the stomach and bowel.

DISEASES OF THE NOSE, EAR, AND LARYNX.

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VACCINE THERAPY.

NOSE—*Acute Purulent Rhinitis*.—Vaccines have been employed in the treatment of various forms of rhinitis, but so far few reports of the results have been published. Kolmer and Weston report on 100 cases of scarlatinal rhinitis where vaccines of staphylococcus, streptococcus pyogenes and diphtheroid bacilli were employed. A distinct shortening of the time of treatment was noticed.

Chronic Purulent Rhinitis (Ozæna).—Mosher and Kerr record the results obtained from vaccine treatment in 18 cases of ozæna. In the first 10 cases they employed stock vaccines made from the different varieties of staphylococcus. The injections were made twice a week over a period of two months, and the results are given as follows:—Headaches improved, odour diminished or absent, crusts smaller, and mucous membrane rendered more moist. During part of the treatment nasal douching was employed. In the second series of 8 cases local treatment with ichthyol, argyrol, etc., was combined with autogenous vaccines of the following organisms:—Staphylococci, pneumo-bacilli, *B. mucosus capsulatus*, and *B. foetidus ozænæ*; the results, however, were no better than in those cases treated with stock vaccines. None of the cases were cured.

Nasal Accessory Sinuses.—Vaccine treatment has been employed in cases of acute bacterial infection of the nasal sinuses, and good results have been claimed, but the number of cases reported is quite insufficient to form a basis for any conclusion as to whether recovery was materially hastened by the use of vaccines. Allen in 1908 reported good results, and Paterson in 1910 recorded 6 cases of acute maxillary antrum infection cured by vaccines. Of 60 cases of chronic sinus suppuration treated by vaccines 16 are reported as cured, 16 were improved, in 5 the result was inconclusive, and in 23 there was no improvement. Surgical measures were employed in most of these cases, and in the successful group there are included—(1) Cases where vaccines were efficacious after failure of operation, (2) cases where vaccines seemed to accelerate improvement after operation, and (3) one or two cases where cure resulted without operation. Many of the cases are not reported in sufficient detail to be included in the following analysis:—Of ten cases of *frontal* sinus suppuration 1 was cured, 4 were improved, and 5 were unsuccessful. Brawley reports the successful case as follows:—Patient suffered from frontal suppuration for three years. The middle turbinal was removed, and the sinus irrigated. Owing to continuance of the discharge cultures were obtained and a vaccine prepared (staph. albus). The discharge rapidly lessened, and in three months swabs from the sinus were sterile. Of 5 cases of *antral* suppuration 3 were reported as cured, 1 as improved, and 1 as inconclusive. In one of the successful cases reported by Gradle there had been maxillary empyema existent for one year. Puncture of the antrum failed owing to resistant bone, and patient refused to allow further interference. A culture revealed staphylococcus aureus, and a vaccine was made. After a few injections the nasal discharge gradually disappeared. Of 16 cases of *multiple* sinus infection 5 were reported as cured, 3 as improved, and 8 as not improved; 2 of the 5 successful cases had undergone no operation. Brawley describes a case of sphenoidal and ethmoidal suppuration in which drainage had been established and

irrigation practised for three months with no improvement. A vaccine of staph. aureus was made from discharge and given in a 500 million dose. In eight days a second injection was given, after which the discharge ceased altogether. One month later swabs from the cavities were sterile. Robertson describes a case of pansinusitis where the bulba ethmoidalis was enlarged and pressed against the septum. No operative measures were taken, but a vaccine of staph. aureus made from the discharge was given in a 5-million dose. This dose was doubled every day that there was no reaction, and after twelve injections the discharge ceased. Two months later no return of the discharge had taken place. An example of vaccine therapy in an intracranial complication of a nasal operation may be quoted. Graef and Wynkoop report a case which developed acute meningitis consequent upon a submucous resection of the nasal septum. Ten days after operation lumbar puncture revealed streptococcus pyogenes. A vaccine was made and doses (10-million) were given daily for five days. Then an increase of 3 million was made daily till a 25-million dose was reached. This dose was given for five days, and then doses were reduced to two weekly. The patient was discharged cured thirty-eight days after admission.

EAR—*Suppurative Otitis Media (Acute)*.—These include those cases recovering within six weeks of onset, and number 27. Of this number 26 are reported as cured, while in 1 the result is given as inconclusive. It is difficult to draw conclusions as to the value of vaccines in these acute cases, the natural tendency to recovery being so great. There are, however, cases recorded which seem to show that cure may be accelerated, and a possible tendency to chronicity checked, by vaccine therapy. Christie, an army surgeon, who had excellent opportunity for close observation of his patients, reports the case of a soldier seen first on 27th August 1908. The man had an inflamed and bulging tympanic membrane: paracentesis was performed, and syringing and inflation were carried out for four weeks. On 27th September discharge increased and pain returned. A culture revealed staph. aureus, and a vaccine was prepared (1 c.c. = 500 millions) and injected. On 30th September pain was absent and discharge had ceased. On 10th October no evidence of discharge was seen, but as a granulation was noted on the posterior half of tympanic membrane another dose was given. On 31st October the membrane appeared normal. On 30th July patient reported, and ear was found normal. During vaccine treatment all local measures were stopped. Christie reports another case of very acute onset in which the membrane ruptured on 27th May 1909. Local treatment was employed, consisting of antiseptic syringing and inflation. On 3rd June there was still some pain and copious discharge. Local treatment was then stopped and a vaccine of *B. pyocyaneus* given (dose 125 millions). On 6th June pain had disappeared and dis-

charge had stopped. Another dose (250 millions) was given on 30th June, when tympanic membrane looked normal. On 1st August 1909 patient reported, and had had no further trouble. Kopetzky gives details of four cases in which vaccines were employed, to the exclusion of other treatment, and in which rapid recovery took place.

Subacute Cases.—These number 163. They are those not exceeding three months in duration, and the most of them are post-scarlatinal. Details are lacking in the great majority. The results are given as 102 cured, 10 improved, 46 inconclusive, and 5 failures. These figures, if the cases bore scrutiny, might be considered as highly satisfactory in post-scarlatinal otitis. Weston and Kolmer in their collection of 100 post-scarlatinal cases give 82 as cured. In all of these they attribute a great acceleration of the rate of recovery to vaccine therapy. They suspended all local treatment, including syringing, during treatment with vaccines. Macgruder and Webb report the case of a man aged 42 in whom there was spontaneous rupture of the tympanic membrane, and in whom the discharge resisted ordinary treatment for 61 days. A vaccine of pneumococcus was prepared and a dose of 14 millions given. Four days later a dose of 20 millions was given, and by the following day the discharge had ceased. Ten months later the patient reported, and there had been no recurrence of the trouble.

Chronic Cases.—These number 181, of which 65 are given as cured, 13 as improved, 64 as inconclusive, and 39 as failures. Nagle in 1910 reported 40 cases, of which 34 were chronic and were cured. In these cases staph. albus and aureus, B. influenza, and B. proteus predominated. This author states that only simple cleansing measures were adopted while the vaccine treatment was in progress. The vaccines were very carefully prepared, stress being laid upon having them very fresh. On an average a dose was given every three days. Duncan, in 1909, reported two cases of chronic pneumococcal infection which were both cured by two injections of autogenous vaccines. He also reports a case of double otorrhea (pneumococcus and staph. aureus) in a nursing. The case had resisted prolonged ordinary treatment, so a mixed vaccine was prepared and given to the mother; the discharge disappeared from one ear after two injections. The infant was then inoculated with a small dose, and a complete cure resulted. Scott reports a case of Bezold's mastoiditis in which there was still copious discharge five months after the radical operation had been performed. A vaccine (staph. albus and diplococcus pneumoniae) was then prepared, and a dose of 50 millions given. A week later a double dose was given, and this was followed by other six injections. After the fourth injection there was no more discharge, and the wound healed. Kopetzky reports 11 chronic cases which he divides into two classes—(a) those with evidence of bone necrosis or caries in the tympanic cavity or its annexa, and (b)

those where the trouble was simply suppurative inflammation of the lining membrane of the tympanic cavity. In 6 examples of class (a) vaccine treatment was practically a failure, but in class (b) 4 cases were successful and 1 was improved. A case of the latter class had had profuse discharge for many years: a vaccine of *B. pyocyaneus* was prepared and a dose of 25 millions given on 12th March; injections were repeated on 14th, 22nd, and 24th March; on 2nd April the ear was found dry, and it remained so. A large perforation completely healed whilst the case was under observation. No other treatment was employed. Todd and Western report 2 cases of tubercular middle ear disease treated successfully with tuberculin and one case which, although the radical mastoid operation had been performed, only seemed to improve after alternate treatment with tuberculin and a staphylococcus vaccine.

LARYNX *Tubercular Laryngitis*.—Blumenfeld points out that tubercular disease of the larynx is in the vast majority of cases secondary to tuberculosis of the lungs or pharynx, while Richards states that the larynx is affected in from 15 to 20 per cent. of cases of pulmonary tuberculosis. We must, however, remember that any change in the larynx of a phthisical patient is not always due to the tubercle bacillus, and further that in many cases of laryngeal tuberculosis there is a mixed infection; for these reasons a laryngeal lesion may not be influenced by tuberculin. In the diagnosis of difficult cases a local reaction in the larynx after an injection of tuberculin may be of the greatest help; on account of the inflammatory reaction the patient may become hoarse for a day or two. Cases with fever and anæmia are not suited for tuberculin, and those with tubercular deposits and tumours are not so successful as those with ulceration; cases with elongated ulcers on the cords are specially suitable for tuberculin. Cases of perichondritis of the arytenoids with swelling of the epiglottis and ary-epiglottic folds are not improved. Blumenfeld considers it advisable to combine open-air methods with tuberculin in laryngeal cases.

Dosage.—In the first tuberculin era—the period of too large doses—acute destruction often followed the injection of tuberculin; for this reason the dosage is very important. The tendency now is to begin with minute doses and only gradually to increase them. Blumenfeld records a case treated with old tuberculin over a period of 4 months. The initial dose was 0.0001 c.cm., and the final dose 1 c.cm.; thirty-four doses in all were given; the patient recovered. Blumenfeld states that if marked reaction occurs the dose should be diminished. He thinks it better to stop after reaching 0.4 or 0.5 c.cm., and then, after an interval, to begin a fresh period of tuberculin treatment. Watson Williams advises the use of bacillary emulsion twice weekly. Wilkinson likes to be able to reach a stage at which he can give large doses without producing a reaction. V. Ruck has recorded 102 cases of laryngeal

tuberculosis treated with injections of a watery extract of tubercle bacilli. Of these 102 cases 38 had slight infiltration and all were cured, 58 had marked infiltration, and of these 29 were cured, 12 improved, 6 unchanged, while in only 2 cases did ulcers form. V. Zander and Springthorpe record good results from tuberculin treatment. Blumenfeld uses tuberculin only in obstinate cases. He has seen 4 cases, in which curettage, cauterization, and lactic acid failed to do well after tuberculin injections. In 1903 he recorded 6 cases of laryngeal tuberculosis (2 treated with tuberculin) in which the cure had lasted for more than six years: he now reports another series of 9 cures of three years' duration out of 60 cases treated: tuberculin was used in 3 of the 9 cases. Wilkinson treats his cases as out-patients. He records 4 successful cases of laryngeal tuberculosis out of 150 cases of phthisis treated in the first stage. In the second stage of the lung disease he had 15 laryngeal cases out of 90 patients; of these 15 cases 6 were slight and recovered entirely, while of the 9 severe cases 7 recovered with good voice, but the progress in the remaining 2 was slow, and the voice remained husky. Even in the third stage Wilkinson maintains that good results are obtained, and in 3 of the 6 cases reported the results appear to have been excellent. Pogue also records 2 cures out of 7 laryngeal cases in the third stage of phthisis. On the other hand, Meissen, Lockard, Gidionson, Neumann, and Clarus are against the use of tuberculin in laryngeal phthisis. Further, at the Vienna Congress (1909), at the Spanish Congress (1910), and at the meeting of the British Medical Association (1911), the use of tuberculin in the treatment of laryngeal tuberculosis was hardly mentioned. Blumenfeld agrees with Heryng—the apostle of operative treatment—that 5 to 6 per cent. of cures is nearer the mark than the 50 to 60 per cent. recorded by some writers. Blumenfeld thinks that tuberculin alone can do very little in cases of laryngeal tuberculosis: it may, however, in favourable cases be an aid to local treatment.

Summary.—The use of vaccine therapy in bacterial infections of the nose and ear is still in the experimental stage, and the number of cases concerning which satisfactory observations have been made are few in number. There seems, however, sufficient evidence to support the following conclusions:—(1) Certain acute cases may be prevented from becoming subacute or chronic by the use of vaccines. (2) The most useful sphere of vaccine therapy is likely to be in subacute cases. (3) In chronic cases, if free drainage has been established, vaccines may prove in some cases a useful adjunct to other treatment, and may occasionally, where other means have failed, bring about a cure. (4) Autogenous vaccines should be used, and in resistant cases should be freshly prepared from time to time. The chief difficulty is the proper isolation of the pathogenic microbe or microbes. (5) Small doses of vaccine, repeated at frequent intervals, have given very good results in

several cases. (6) From the cases reported no definite conclusion can be reached as to the particular bacterial infections most suitable for vaccine therapy. (7) In cases of tubercular laryngitis the use of tuberculin may be an aid to local treatment (Blumenfeld).

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MEDICAL JURISPRUDENCE.

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HISTOLOGICAL CONDITION OF THE VISCERA AFTER EARTH BURIAL FROM TWO TO FOUR WEEKS.

H. VERGER (*Comp. rend. de la Soc. de Biol.*, 1911, No. 15, p. 662) has made some observations on the degree of resistance of the various tissues after burial which have some practical medico-legal bearing. Rabbits, killed by a blow on the nape of the neck, were buried 60 cm. deep in earth in closed coffins after 24 hours' exposure to air. They were exhumed at periods from 2 to 4 weeks later, the air

temperature in the meanwhile having been on an average just below freezing-point. The tissues were fixed in alcohol and examined. It was found that even after a month the structure of the organs was still recognisable, and elective staining of the protoplasm and nuclei was still possible, but better so in the muscles and connective tissues than in the parenchymatous elements. Histological diagnosis of parenchymatous lesions was practically impossible, but the recognition of scleroses was still comparatively easy. Under the conditions mentioned recognition of lesions in the mucous membrane of the stomach or intestine was scarcely possible—at most one might recognise a deep ulcer which extended down to the muscular coat.

FLOATING OF THE LUNGS IN A NON-DECOMPOSED, STILL-BORN CHILD.

A case recorded by Millardet (*Ann. d'Hyg. pub. et de Méd. lég.*, 1910, p. 517), although possibly very rare, must make one careful in regarding floating of the lungs as proof of live birth, and even still more careful in estimating the value of Breslau's stomach-bowel test. The history of the case was as follows:—A 29-year-old primipara entered the maternity hospital because the waters had escaped some hours previously. After admission she lost a considerable quantity of greenish, foul-smelling fluid. Next day the child's heart sounds ceased, the uterus became tympanitic and went into tetanic contraction, and the mother's temperature rose. The head presented in an occipito-posterior position, but as progress was delayed at the vulva forceps were applied, when it was found that the abdomen of the foetus was greatly swollen. When this had passed the vulva complete expulsion occurred with a loud detonation, followed by much foul-smelling fluid and gas. At the post-mortem examination 38 hours later, the foetus, almost a full-time one, was not decomposed, although the skin was slightly macerated (as it was at birth). The lungs looked like those of a child who had never breathed, but on the surface there were some bullæ of gas. They floated when tested along with the heart and thymus. When cut up all the small parts floated, but they sank after very firm pressure and also after 24 hours' soaking in water. The stomach was much distended with gas, and so was the whole of the intestine to a uniform degree. The case could not have been one of intra-uterine respiration, for there was not the necessary manipulative interference to let air in, and the child was dead before the development of the gas inside the uterus from the inflammatory condition. The author's opinion is that this was a case of gas developing from intra-uterine infection after rupture of the membranes, and that the gas, being under considerable pressure, had penetrated to the very alveoli of the lung and along the whole

length of the alimentary canal. Had the history of the case not been known one would have been very prone to have regarded the body of the child as that of one which had enjoyed an extra-uterine existence. The important point in differentiation was that the lungs, although capable of floating with the heart and thymus attached, were not fully expanded, that firm pressure could expel the air, and above all, in the writer's opinion, that by keeping the lungs in water for some time the elasticity of the lungs itself expelled the gas, so that the pieces sank—a thing which will never occur with the air introduced by the forcible respiratory efforts of the child.

ACTS OF VOLITION AFTER SEVERE INJURY.

Lochte (*Wien. med. Wochenschr.*, 1911, No. 15, S. 957)—from consideration of a case where a man who was stabbed in the abdomen and who died ten hours later from loss of blood was alleged to have defended himself forcibly, wounding his assailant with a stone, and afterwards to have walked 1 or 2 kilometers—has been led to make a general investigation of the capability of a severely injured person of carrying out various actions after the injury, and has brought together a number of interesting cases dealing with acts performed after incised and stab wounds, after gunshot injuries, and after injuries from gross violence, such as crushes or falls

Extensive stab wounds of the heart and of neighbouring organs, from the observations adduced, need not at once suspend the power of action; even after complete severance of the large arteries in the neck quite complicated actions have been known to be carried out. Severe injuries to the bones of the lower extremities, as is well known, do not always render a person incapable of walking, even for a considerable distance. Gunshot wounds through the heart, lungs, or abdomen, as examples show, by no means suspend the power of voluntary action, and even when there has been considerable injury to the brain from bullet wounds of the skull, the injured person, as was seen over and over again in the South African War, may still be capable of considerable power of action. A similar thing is seen after fracture of the skull so long as consciousness remains present. Other examples quoted are movements or actions carried out after such injuries as rupture of the right auricle from a kick by a horse, rupture of the liver by being run over, rupture of the bladder, and rupture of the pregnant uterus and avulsion of the small intestine from attempt to procure abortion. His final conclusion, stated emphatically, is that, in cases of this nature one cannot, from a medico-legal standpoint, consider any movement or action impossible unless there is very clear evidence to the contrary.

WASSERMANN REACTION IN LEAD-POISONING.

From the examination of a number of cases of chronic lead-poisoning, Schnitter (*Deutsch. med. Wochenschr.*, 1911, No. 22, S. 1030) finds that some of them—cases showing no signs of either old or recent syphilis—give a positive Wassermann reaction. The patients who gave it had all been working for at least several months in a lead factory, whereas of the negative cases none had been exposed to the influence of the lead for longer than two months. He considers that the complement deviation may be due to the changes in the red blood corpuscles which are evidenced by the punctate basophile staining in chronic lead-poisoning. The test is hardly likely to be of value in the diagnosis of lead-poisoning, but, if corroborated, may be a point to be kept in mind in testing for syphilis by the reaction.

PRINTERS' PALSY—CHRONIC ANTIMONIAL POISONING.

McWalter (*Journ. Roy. Inst. of Pub. Health*, July 1911, p. 413), from his experience amongst printers in Dublin, in whom he has seen numerous cases of a form of neuritis somewhat resembling that due to arsenic, brings forward the suggestion, although he does not by any means conclusively prove his case, that many of the disorders which printers suffer from are due to antimony and not to lead. Type metal is an alloy of lead, containing from 25 to 33 per cent. of antimony: it also contains tin, and sometimes copper. The disease as he has seen it is not fatal, but is characterised by languor, intense depression, pallor, tremor like writers' cramp but more painful, and rather more confined to the ulnar side of the hand, pains in the region of the bladder and urethra, temporary impotence, difficulty of breathing without physical signs of lung disease, irritable overaction of the heart, and gastric irritation. These symptoms are not very distinctive, but they are found in men working with type who present few, if any, of the classical signs of plumbism. Occasionally colicky pains are present, but by no means so persistent as in lead poisoning. He has seen no liability to pustular eruptions, such as are seen in antimony smelters, or as used to be seen from the use of tartarated antimony ointment. Eulenburg has stated that exposure to the fumes of oxide of antimony is followed by pain in the pelvic region and by anaphrodisia. Most of the cases get well under such treatment as rest, milk, quinine, and *nux vomica*, but where actual palsy is present it is not very amenable to treatment.

The poisoning is not seen merely amongst men who handle type, although it is less common amongst linotype workers. As the smelting operations are often carried out under the same roof as the type-setting, inhalation is easily possible. It has also been shown that the dust of printing-offices may contain as much as 11 per cent. of lead, and if antimony should be present in the same proportion as it is in the type metal

it can hardly be without effect on the health. It is possible that arsenic may also be present as an impurity in the metal, and that the absorption of that drug may be responsible for some of the symptoms, but the writer claims, at all events, that some of the disorders which printers suffer from are not simply due to the effects of lead.

CHRONIC ACETANILID POISONING.

Acetanilid, as is well known, forms the chief constituent of most of the headache and neuralgia powders and tablets which are sold so freely over the druggist's counter. Considering the toxicity of antipyrin and other members of the group, the wonder is that more is not heard about the poisonous effects of their long continued abuse. Gordinier (*Boston Med. and Surg. Journ.*, 10th Aug. 1911, p. 198), in recording two cases and discussing the condition, considers that this is because the condition is often overlooked owing to the patient's wilful deception. Many of the cases actually recorded have been at first regarded as cardiac disease, tuberculosis, polycythæmia, neurasthenia, etc., etc. He concludes that the continual ingestion of acetanilid or allied products produces a very definite syndrome of cyanosis, with enlargement of the heart, spleen, and liver, definite changes in the blood and urine, and that there is an equally definite acetanilid habit with enslavement comparable to that of opium or alcohol.

The subjective symptoms are:—Great general weakness, nervous excitability, insomnia, loss of appetite, digestive disturbances, palpitation, dyspnœa, numbness of the extremities, pain over the liver and spleen, and fainting attacks. Objectively there is cyanosis, often extreme, but usually fluctuating in intensity, the periods of greatest intensity coinciding with an increase in the subjective symptoms. This cyanosis is accompanied by marked pallor of the mucous surfaces, but is without any clubbing of the fingers. The resemblance to polycythæmia is the more striking in that the red blood cells may be much increased in number at first. One of the author's cases gave a count of 9,200,000 per c.mm., with some poikilocytosis, but no other striking change: some years later, however, the count had fallen to a little over two millions. The colour of the blood is bluish-black or chocolate. The urine is dark brown or black in colour, and may contain blood pigments in the form of methæmoglobin or hæmatoporphyrin, but the abnormal colour is usually due to urobilin. The ethereal sulphates are greatly increased at the expense of the inorganic sulphates. Acetanilid can readily be detected in the urine by the indophenol reaction, a point of practical importance in the diagnosis. This consists in boiling some of the urine with a little concentrated hydrochloric acid, then adding a drop of carbolic acid and a few drops of freshly prepared calcium hypochlorite solution. A reddish colour is produced which is turned blue by ammonia. One case of the writer's showed several

points of superficial ulceration in the skin, a trophic change apparently due to the acetanilid. This patient had been taking for four years a daily dose of from 50 to 75 grs. Rapid improvement follows on the withdrawal of the drug.

PATHOLOGY.

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RECENT RESEARCH ON CANCER.

IN spite of all the special work in cancer that has been carried on during the last decade, it must be frankly admitted that, from a practical point of view, we are not much further on than we were ten years ago. One can point to no striking discovery which has revolutionised either the prophylaxis, the diagnosis, or the treatment of the disease. On the face of it this result is disappointing, but when one considers the question carefully one must admit that the researchers have done merely what was right in moving slowly, in testing each advance, and so in laying a sure foundation for future progress. Much of the time has been devoted to systematising knowledge, and, by means of statistical inquiries, correcting former assumptions.

The appearance of the Fourth Scientific Report of the investigations in connection with the Imperial Cancer Research Fund seems to be a suitable occasion for taking stock and noting progress.

During these ten years of investigation we may note certain phases in the work, more especially of British cancer researchers.

GAMETOGENIC MITOSIS.

Shortly after the establishment of the Imperial Cancer Research Fund there appeared the work of Farmer, Moore, and Walker upon nuclear division in malignant growths. These observers stated that according to their observations the appearances which are seen during the nuclear division of cancer cells are precisely similar to those found in the sexual germ cells during the series of cell divisions preceding fertilisation known as maturation. These appearances are, firstly, a reduction in the number of chromosomes to one-half, and secondly, an alteration in type, so that instead of being rod-shaped or V-shaped they are in the form of rings or loops. To quote Farmer (*Nature*, 14th February 1903), "The heterotype divisions can be recognised with certainty in every malignant growth so far examined, and it is precisely similar in character to the normal heterotype that occurs in sexually-reproductive cell series. The same peculiarities in the early differentiation of the chromosomes culminating in the production of rings, loops, etc., the same reduction in the number, and the same transverse division

of each when attached to the spindle, reappear in these cells with the greatest uniformity." According to these observers these characteristics provided a means of distinguishing between tumours of simple and those of malignant nature.

At first the cancer research workers, Bashford and Murray, confirmed these results (*Proc. Roy. Soc.*, London, 1903), but later (*ibid.*, 1906) they withdrew their confirmation, stating that they believed that the division of the heterotypical reducing type in cancer were in reality somatic divisions, and not analogous to the appearances in reproductive tissue. A paper has, however, appeared quite recently (*Journ. of Path. and Bact.*, October 1911) in which Walker, along with Whittingham, working in the research department of the Glasgow Cancer Hospital, by a series of most painstaking and exhaustive investigations, show that the appearances in the nuclear divisions of cancer cells do resemble very closely those seen in reproductive tissue. To quote their own words—"We believe that the observations recorded here support very strongly the direct comparison between the cells of malignant growths and those of normal gametogenic tissue. The proportions of cells containing the somatic and half the somatic number of chromosomes approach so nearly to those found in the human and other testes as to preclude the probability of the resemblance being fortuitous." On the other hand, nuclear division in inflammatory conditions does not show this similarity with reproductive tissue. "In spite of the tendency to group round the neighbourhood of half the somatic number of chromosomes, the reduction in inflammatory cells, as shown by the figures given here, is not sufficiently regular to warrant a comparison with the reduction taking place in gametogenic cells, while the reduction in cancer cells is. What irregularities do occur among cancer cells may, as we have already suggested, be explained by the co-existence of inflammation, which produces asymmetrical divisions.

"We are inclined to interpret these observations as showing that phenomena similar to those preceding the normal production of gametes takes place among the cells of malignant growths. We do not, however, hold that the occurrence of meiotic phenomena is the cause of malignancy. Gametogenic cells live upon the organism in which they occur in a parasitic manner; that is, they are not in somatic co-ordination. It is known that in certain plants groups of cells, in response to suitable stimuli, will proceed to live in a parasitic manner upon the parent organism, and will then pass through the meiotic phase. We believe that the occurrence of meiotic phenomena among the cells of malignant growths is due to the fact that they have, in response to some stimulus or stimuli, passed out of somatic co-ordination, and are living in a parasitic manner upon the parent organism."

This would seem to support Butlin's views published recently (*Brit. Med. Journ.*, 25th November and 2nd December 1911). As a matter

of fact, however, this parasitic view of cancerous growth is no new thing. Long before Butlin, and even before Powell White, many pathologists regarded the neoplasm as parasitic upon its bearer. Starting as the tumour often does from a single cell, it is in a sense analogous to a unicellular protozoon, but in a similar sense so are all the cells of the body, more especially the wandering cells. To say that this parasite (Butlin) is a new creation from the tissues of the host is just another way of saying that a cell has arisen endowed with capacity for unlimited independent growth. That, as a matter of fact, is the view of most pathologists regarding the cancer cell, but it does not carry us much further. It seems unnecessary to find a place for this parasite and give it names such as *unicellula cancri spheroidalis*, *unicellula cancri squamosa*, etc. As we shall see later, the cancer cell can be proved to be capable of growth outside the body, but again that is a characteristic apparently possessed by most other body cells.

Undoubtedly the greatest stimulus to cancer research has been the discovery of inoculable tumours in mice. Jensen's adeno-carcinoma was the first of these observed. Now there are at least 700 different tumours of various types which have been inoculated from animal to animal. These tumours arise spontaneously chiefly in the older animals, and almost entirely in females. When inoculated into young animals, however, they grow more readily than in the old. Up to the present, according to Apolant, only one case of spontaneous tumour has occurred in a male mouse.

From the observations of these tumours much has been learned during the last ten years (1) as to the method of growth of cancer; (2) as to the production of immunity; (3) as to the possibility of the transmission of susceptibility from parent to offspring. It may be stated at once that it is now generally admitted that these tumours are really cancers analogous to malignant tumours in man.

METHOD OF GROWTH IN CANCER.

The main facts regarding the growth of these cancer grafts have been ascertained for some time. A summary may not, however, be out of place. After the inoculation of the graft into the tissue of a fresh animal certain elements of it degenerate and disappear, certain others grow and multiply. The elements which disappear are the connective tissue elements of the supporting stroma; the elements which multiply are the epithelial cancerous cells. For some time after the inoculation the tissues around show no evidence of disturbance. The first appearance of reaction consists in a rapid aggregation of polymorphonuclear leucocytes around the introduced mass. These penetrate between the tumour cells and accumulate in the stroma. At the same time the connective tissue of the host begins to undergo

proliferative changes. The connective tissue cells divide first by amitotic and later by mitotic division. The proliferating connective tissue cells migrate into the space between the older tissue and the introduced tumour. These spindle shaped cells apply themselves to the surface of the transplanted tumour and begin to penetrate it. From the nearest capillaries young blood-vessels are developed. These penetrate the tumour along with the young connective tissue cells, and eventually form the vessels and the stroma of the new growth. All this time the tumour cells have been multiplying, and these new cancer cells and stroma assume the relationship to one another which obtained in the original growth.

The facts to be learned from the above observations are:—In the first place the stroma and the nourishing vessels of the growth are part of the reaction of the host. They are borrowed elements not belonging to the tumour itself. The new tumour is derived solely from the parenchymatous cells of the original growth. There is no assumption of malignant characters by the cells of the host. The tumour thus impresses its needs upon the organism in which it grows, not merely by inducing the production of vessels and stroma, but at a greater distance by causing an increase in the secretion of hydrochloric acid in the stomach (Copeman and Hake, *Third Scientific Report*, 1908).

Sarcomata have also been grown in the rat and mouse in this way, and the phenomena are practically the same. A curious transformation of carcinoma into sarcoma has also been observed in the course of these inoculations. At first it looked as if this were going to prove to be an example of a type of metaplasia hitherto unknown, *i.e.* the transformation of tissue of epithelial nature into tissue of connective tissue nature; but on further examination it was found that what had happened was that the connective tissue stroma cells had taken on a malignant character and had developed into a tumour. For a time the tumour cells of the two types grew together, but eventually the sarcomatous elements prevailed and the tumour became a pure sarcoma. The mixed tumour stage lasted for 3 or 4 generations (Bashford, *Fourth Scientific Report*, 1911). This transformation has been observed in four distinct tumour strains. It is probably to be put down to the irritative multiplication of the proliferating stroma cells, and is in line with what is already known of the relation between malignant disease and chronic irritation.

Variations in the arrangement and character of cancerous elements themselves have also been observed. Adeno-carcinomata have lost their acinous arrangement. Sometimes for many generations the cancer cells have become spindle-shaped, but have again shown acinous differentiation (Haaland, *Third Scientific Report*, 1908). Osteo-sarcomata have been found on continued propagation to lose their bony character.

Spontaneous absorption and disappearance of tumours has been observed in these inoculable animal tumours, just as it has occasionally been seen in malignant disease in man. It has been seen both in the spontaneously developing tumours and in grafts. In both cases this healing is connected microscopically with the accumulation of phagocytic cells around the tumour mass in a space between it and a capsule of well-formed fibrous tissue. Bashford notes the frequent occurrence of hæmorrhage in these cases and in cases of healing under treatment with radium. He suggests that this hæmorrhage is a preliminary condition to the other processes, and that the connective tissue proliferation is initiated by it (*First Scientific Report*, 1905).

Similar appearances are seen in cases in which the cancer graft fails to grow owing to the previous immunisation of the animal (*Third Scientific Report*, 1908). In such immune animals a rapid destruction of the cancer elements takes place, although some go on dividing for a time, and there is an absence of stroma and vessel formation on the part of the host. The failure of the vascular supply leads to necrosis of the graft.

The failure in the growth of grafts in immune animals is ascribed by Bashford and Murray to the presence of something in the fluids and tissues which inhibits the chemiotactic influence which the cancer cells exert upon the tissues of the host.

On the other hand Levin (*Journ. of Exper. Med.*, vol. xiii. No. 6, 1911) denies that a stroma is necessary for the growth of a transplanted tumour. If a portion of a tumour is introduced into a parenchymatous organ, such as the liver, there is no formation of new connective tissue, and yet the tumour cells grow and infiltrate the organ. He considers that the failure of a tumour graft to "take" in an immunised animal is not due to the failure to produce a stroma, but is to be ascribed (*Journ. of Exper. Med.*, vol. xiv. No. 2, 1911) to an active inhibitory influence of some substance present in the body of the immune host. He considers that immunity to the growth of cancer must be very similar to, although not identical with, immunity to pathogenic organisms.

Still another view is taken by Ehrlich and Apolant (*Zeitschr. f. Krebsforschung*, Bd. xii. Heft 1, S. 97, 1911). These authors state that stroma formation *does* occur in immunised animals, and that in any case the absence of stroma formation is really no explanation of the phenomenon. They believe that the cancer cells possess a great avidity for a certain specific food within the organism of the host. When a cancer fails to grow in an animal then either the organism of the host does not possess the necessary specific food, or else the avidity of the cancer for this food is not strong enough to deprive the normal tissue cells of it. When the organism of the host is immunised by treatment with a cell emulsion these cells bind the specific food, and consequently the

cancer cells inoculated subsequently do not find the nourishment they require, and therefore die. This substance they believe to be of the nature of an internal secretion. It differs in different species, which fact explains racial immunity. The theory Ehrlich has named "athreptic." It is similar to the one suggested long ago by Pasteur to explain the phenomena of immunity against bacteria and their poisons.

Another interesting contribution to the growth of cancer is made by Levin and Sittenfield (*Journ. of Exper. Med.*, vol. xiv. No. 2, 1911). Working with a mouse sarcoma and a rat carcinoma, they came to the conclusion that the determination of the site of a metastasis is not due to the particular channel invaded (lymph or blood-vessel), but to the specific affinity between the cells of the tumour and the cells of the site of deposit. That is to say, that a carcinoma shows a specific affinity for lymphoid tissue. These observers saw sarcoma cells in close relation to lymph glands, but there was no evidence of multiplication.

One of the most interesting discoveries of recent months in relation to growth of cancer is the observation and investigation of the growth of cancer cells in media "*in vitro*." Details relating to this may be found in papers by Carrel, Burrows, Lambert, and Hanes (*Journ. of Exper. Med.*, vols. xiii. and xiv., 1911). The observations are not restricted to cancer cells. Normal thyroid gland, ovary, testicle, spleen, and kidney cells have all been grown in blood plasma in test tubes. The rapidity of growth could be hastened or retarded by varying the concentration of the plasma. The normal concentration is, curiously enough, not the best for the purpose. In the growth of these tissues outside the body a stage of latency is observed, followed by a stage of growth and then by a stage of cell destruction. In the case of the thyroid cells the first stage lasts for 48 to 72 hours, the second stage up to 18 days, with a period of greatest activity of 6 to 8 days. The third stage begins after 8 to 10 days. If the cells are re-inoculated into fresh plasma growth starts afresh.

With regard to tumours, sarcomata and carcinomata of rat and mouse have been used, and have been successfully cultivated. Under these conditions the tumours grow very fast. The cells show amoeboid movement passing into the surrounding plasma. Mitotic figures are numerous among the nuclei of the cells. There is active phagocytosis of the cells for foreign particles, such as carmine. Rat sarcoma may be cultivated in mouse, guinea-pig, rabbit, and dog plasma as well as in rat plasma. Sarcomata grow in plasma obtained from immune animals as well as in that from susceptible ones and in tumour-bearing ones. This the authors consider is a fresh proof of the absence of specific destructive bodies in the fluids of animals immune to inoculated cancer. The tumours growing in artificial media may be re-inoculated successfully into animals.

NEW BOOKS.

Diseases of the Nose and Throat, Comprising Affections of the Trachea and Oesophagus: A Text-Book for Students and Practitioners. By ST. CLAIR THOMSON, M.D., F.R.C.P.(Lond.), F.R.C.S.(Eng.), Professor of Laryngology in King's College Hospital. Cassell & Co., Ltd. 1911.

NOT only is our knowledge of diseases of the ear, throat, and nose constantly progressive, but the area which has hitherto been comprised within the scope of the specialist in these diseases has been in recent years considerably enlarged. The surgery of the trachea, bronchi, and œsophagus on the one hand, and the brain and its membranes on the other, has been added. In consequence of this it has become necessary for the writer of a text-book not only to divorce the ear from the nose and larynx, but in writing upon one or other of these branches he has found it necessary to produce a volume of very considerable magnitude. While the tendency to treat separately the diseases of regions which are so intimately associated is increasing, it is questionable how far it is expedient to do so in the preparation of a text-book intended for students and practitioners. It necessitates for them the purchase of two books, and it entails a considerable amount of reading upon subjects which are probably outside their province. To the specialist, on the other hand, it is undoubtedly an advantage, as it enables the author to place before the reader a detailed account of the etiology and pathology of his subject as well as a complete exposition of the clinical appearances and treatment of disease.

We welcome the publication of Dr. St. Clair Thomson's book, and we cordially congratulate the author upon its already assured success. Whether regarded from the anatomical, pathological, or clinical side, it must be confessed that he has spared no time or thought in the production of a complete and attractive account of the diseases of the nose and throat. His own extensive training in general medicine has enabled him to take a wider view of his subject than others with more restricted knowledge would have done. The opening chapters, dealing with physiology, methods of examination, treatment, the danger and sequelæ of operations, and the symptoms of nasal disease, form a valuable introduction to the rest of the volume, and are deserving of careful study. The author has properly appreciated the importance of duly distinguishing between the more common affections and those which are more rarely met with, the descriptions of the former being treated in detail, while the latter are more shortly dealt with. We are glad to see that Dr. Thomson, while duly acknowledging the

work of foreign writers, has quoted freely from the writings of his own countrymen. We cannot say the same of every text-book writer. The book is eminently practical, and we can thoroughly recommend it to the favourable notice of the profession.

Principles of Anatomy: the Abdomen proper. By WM. CUTHBERT MORTON, M.A., M.D.(Edin.). Pp. 174, and 14 large back and front plates. London: Rebman Ltd. 1911. Price (including plates and frames) 42s. net.

THIS work consists of two parts—the text and a series of 14 separate plates. These plates, which are the work of the author himself, reflect the greatest credit alike on him and on the publishers. They are clearly and distinctly reproduced, and will be welcomed not only by students and graduates but also by teachers who have to deal with small classes. The method of cutting-out adopted in order to allow the various plates to be correlated has rendered some of them rather fragile, but if they are handled with moderate care this objection should not be serious. It is doubtful whether the average student will thoroughly appreciate the intricacies of the peritoneum from the plates alone, but he will find them of great value when he is studying the relations of the various organs to one another.

Many innovations in method and sequence of description are introduced in the text. The subdivision of the abdominal cavity into a mesenteric and a celiac compartment is perfectly sound, but the author cannot be commended on dealing with the rectus sheath before he describes the lateral muscles of the abdominal wall. At the present time, when endeavours are being made to introduce the B. N. A. nomenclature, such new terms as “the lesser gastric mooring” only serve to increase the existing confusion. Numerous tables are included in the book. Many of them are likely to be helpful to the students, although those that refer to the visceral relations of the abdominal organs tend rather to harass the reader than to help him to summarise his knowledge.

The whole of the text is amply cross-referenced, but in some cases this device is used to shorten important sections. In this way the relations of the abdominal aorta and inferior vena cava become merely lists of structures. Many of the references only irritate the reader. In the fourth paragraph of section 108 the reference given is not useful, whereas in the following paragraph, where a cross-reference is essential, none is given. We hope to see these references revised and altered in subsequent editions.

Much of the descriptive work is of a high standard, but it is, as a whole, rather unequal. Too little space is accorded to the inferior

surface of the stomach and to the ureters, and the description of the lesser sac of the peritoneum is not convincing.

The book is well bound and admirably printed, but it is difficult to fathom the reason why the word "peritoneum" is sometimes printed in letters of almost overpowering size, while at others it only appears in ordinary type.

Diagnostic and Therapeutic Technic. By ALBERT S. MORROW, M.D.,
Adjunct Professor of Surgery, New York Polyclinic. Pp. 775.
815 Illustrations. London: W. B. Saunders Co. 1911. Price 21s.

IT is not within the reach of all young graduates to serve in hospitals as house surgeons or house physicians, nor is it possible for all older graduates to attend post-graduate courses. To such, wide and constant reading is the alternative; but in most text-books there is a felt want of detail in describing simple procedures of daily practice in hospital clinics.

It is to these small details that Professor Morrow has turned his attention. In clear and concise language, with illustrations copious in number and clearly portrayed, he travels over the whole of medicine, surgery and gynæcology, selecting those minor procedures so much of a routine to the specialist as to be taken for granted as understood.

"The majority of the methods detailed are the everyday practical procedures which the hospital interne or the general practitioner may at any time be called upon to perform."

By these this book will be welcomed; also, the student in the larger schools of medicine who has difficulty in obtaining sufficient practice to become expert, will find a perusal of this practical treatise a good substitute for actual performance.

Professor Morrow is to be congratulated on the excellent treatise which he has been able to produce from material so commonplace to one of his position and learning.

Delayed and Complicated Labour. By Robert JARDINE, M.D., M.R.C.S. (Eng.), F.R.F.P.&S.(Glas.), F.R.S (Edin.). With One Hundred and Seven Illustrations and Three Coloured Plates. London: Henry Kimpton. 1911. Price 7s. 6d. net.

IN this offspring from clinical obstetrics the author details his large and varied experiences in cases of delayed and complicated labours, which will be found of real practical value.

Special attention is drawn to the subject of the retraction ring, not only as a result, but as a *cause*, of obstruction in delayed labour.

Professor Jardine relates two cases in which forceps had been decided on for delivery in cases of contracted pelvis, but where, in spite of the patients being put deeply under the influence of morphia some hours previously, in neither case was there any relaxation of the retraction ring, so that Cæsarean section had eventually to be carried out.

Many of the illustrations are already familiar, but the coloured plates showing the pathological changes in the kidney and liver in the chapter on eclampsia are distinctly good.

BOOKS RECEIVED.

Abhandlungen u. d. Geb. der Geburtshilfe u. Gynäkologie. Edited by Tadmor. Vol. ii.

- Part I. 4 mk.
 Bidwell, L. A. Minor Surgery (Frowde, Hodder & Stoughton) 6s.
 Browning and Mackenzie. Recent Methods in the Diagnosis and Treatment of Syphilis
 (Constable) 8s. 6d.
 Bryant and Buck. American Practice of Surgery . Vol. viii. (Wood & Co., New York) —
 Cohn, T. Leitfaden der Elektrodiagnostik u. Elektrotherapie . (Karger, Berlin) 6 mk. 60 pf.
 Collins and Mayou. System of Ophthalmic Surgery, Pathology and Bacteriology (Rebman) 21s.
 Dannreuther, W. T. Minor and Emergency Surgery (Saunders Co.) —
 Davis, G. C. Applied Anatomy (Lippincott) 24s.
 Dickey, J. S. Applied Anatomy of the Lungs and Pleural Membranes (Mayne & Boyd) 5s.
 Dorland, W. A. N. Illustrated Medical Dictionary (Saunders Co.) 19s.
 Emerson, C. P. Clinical Diagnosis. Third Edition (Lippincott) 21s.
 Fleming, R. A. A Short Practice of Medicine (Churchill) 12s. 6d.
 Fordyce, D. The Care of Infants and Young Children (Livingstone, Edinburgh) 1s. 6d.
 Fourth Report, Wellcome Laboratories, Khartoum. Vol. A. Medical
 (Baillière, Tindall & Cox) 21s.
 Herz, H. Die Störungen des Verdauungsapparats. 1st Part (Karger, Berlin) 6 mk. 60 pf.
 Holt, Emmett. Diseases of Infancy and Childhood (Appleton & Co.) 25s.
 Hutchison and Collier. Index of Treatment. Sixth Edition (Wright & Sons) 21s.
 International Clinics. Vol. iii. 21st Series (Lippincott) —
 Johnstone, R. W. Outlines of Early Development. (Currie, Edinburgh) 1s. 6d.
 Knox. Climate of the Continent of Africa (Cambridge University Press) 21s.
 Lippincott's New Medical Dictionary (Lippincott) 21s.
 Macdonald, D. A. Red Cross Manual of First Aid and Stretcher Drill (Gill & Sons) 1s.
 McKisack, H. L. Dictionary of Medical Diagnosis. Second Edition
 (Baillière, Tindall & Cox) 10s. 6d.
 May and Worth. Diseases of the Eye. Third Edition (Baillière, Tindall & Cox) 10s. 6d.
 Mortimer, J. D. Anaesthesia and Analgesia (Frowde, Hodder & Stoughton) 6s.
 Nisbet's Medical Annual, 1911 7s. 6d.
 Nordiskt Medicinskt Arkiv. Surgery. Vol. i. (Norstedt, Stockholm) —
 Pozzi-Escott, Em. Explosions et Explosifs (Librairie Med. et Sci., Paris) 1 fr. 50 c.
 Publications of the Massachusetts General Hospital. Vol. iii. (Barla Press, Boston) —
 Records of the School of Medicine, Cairo. Vol. iv. —
 Report of the Health of the Army for 1910. Blue Book 1s. 6d.
 Report of the Local Government Board on the Control of Phthisis in Glasgow 2s.
 St. Luke's Hospital Medical and Surgical Reports. Vol. ii. (Howard, New York) —
 St. Thomas's Hospital Reports. New Series, vol. xxxviii. (Churchill) 8s. 6d.
 Saleeby, C. W. Modern Surgery and its Making (Herbert & Daniel) 10s.
 Scott, S. Physiology of the Human Labyrinth (Heffer & Sons, Cambridge) 2s.
 Sewill, Henry. Quackery and Medical Law (King & Sons) 6d.
 Swanzy and Werner. Diseases of the Eye. Tenth Edition (Lewis) 12s. 6d.
 Whelham, W. Manual for Nurses (Mills & Boon) 3s. 6d.
 Whitaker, C. R. Essentials of Surface Anatomy. Second Edition (Churchill) 3s. 6d.
 Wilson, J. C. Medical Diagnosis. Third Edition (Lippincott) 25s.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

**The Scottish Medical
Insurance Council.**

THE most important event since we last wrote on the subject of the Insurance Act is the institution of a Central Council to act for the profession in Scotland in safeguarding its interests in relation to the steps necessary to bring the medical sections of the Act into force. The body which is in process of formation will be thoroughly representative of all branches of the profession, as it will include representatives from the Scottish Universities and Royal Corporations, the Scottish Committee of the British Medical Association, and, in addition, one or more practitioners drawn from each of the insurance areas throughout the country.

It is particularly gratifying that the Universities and the Royal Corporations have thrown the weight of their influence into this movement, as it ensures that the widest interests of the profession and of medical education will be duly considered and protected. We are given to understand also that it is the intention of these bodies to offer financial support in so far as their constitutions enable them to do so.

The adherence of the Scottish Committee of the British Medical Association is another great source of strength to the Council. Its members are already conversant with the needs and desires of the profession, and they command the machinery by which these can be co-ordinated and expressed. Their willingness to co-operate with the other representative sections augurs well for the success of the movement, and dispels all doubt as to the absolute unanimity of the profession on the fundamental issues at stake.

In our opinion, however, the most important, as it will apparently be the largest, element in the Council is the body of practitioners selected from every part of the country. It is intended, we understand, that every registered medical practitioner shall *ipso facto* have a voice in the selection of these members, and as the election is to be by postal vote, every doctor in Scotland can, without the slightest inconvenience, take part in it.

We cannot too strongly impress upon the practitioners of Scotland the importance of sending to the Central Council men who represent the mature and deliberate opinion of the district from which they come,

and who can be relied upon to give expression in council to that opinion, whatever it may be. In this way, and in this way only, can the Council fulfil the purpose of its existence and become the mouthpiece of the whole profession in Scotland.

The important announcement to which the *British Medical Journal* gave prominence in its issue of 13th January, that 27,000 members of the profession have signed the undertaking to adhere to the six cardinal points, makes it abundantly clear that the Central Council will have behind it practically the whole force of medical public opinion on the essential points in its policy.

It is too early to forecast the lines on which the Council will be likely to act in dealing with the Commissioners, and it would be premature to offer suggestions. That they will adhere to the position taken up by the profession from the beginning of this controversy goes without saying. For the rest, we are content to leave the working out of details to a body so thoroughly representative of all shades of opinion in the profession, and we do so with a profound feeling of confidence in the result.

"The philosophical investigations of Pasteur made me a convert to the germ theory, and it was on the basis of that theory that I founded the antiseptic treatment of wounds in surgery" (Lord Lister, *Collected Works*, i. 276).

The Triumph of Modern Surgery. THE flood of success in operative surgery on which the modern surgeon so triumphantly floats is due to the genius of three great men—Semmelweiss, Pasteur, and Lister.*

Semmelweiss's work did not make the mark on surgery that Lister's did. The former stated the doctrine of the unclean touch; that septic mischief was introduced from without, and that antiseptics were necessary to counteract it (he used chlorinated soda for this), but the surgeons of that time and afterwards brushed all this aside with the remark that this was merely the cleanliness which they practised. Semmelweiss, as we now see, showed in general how to prevent sepsis, but he described no exact technique, did not recognise all the sources of contamination, and thus in surgery his work fell practically dead.

We are apt to forget that Pasteur was not a medical man; indeed in his early career the supercilious might have termed him an amateur

* Lister, Joseph; Baron Lister, *Collected Papers*, 2 vols., Oxford, 1909.

Vallery-Radot, René, *Life of Pasteur*, with a foreword by Wm. Osler, M.D., F.R.S., 1911.

Sinclair, Sir W. J., *Semmelweiss, his Life and Doctrine*, Manchester, 1909.

Saleeby, C. W., *Modern Surgery and its Making*, London, Herbert & Daniel, 1911.

in medicine. He began by investigating polarisation phenomena in tartaric acid crystals, and went on from studying the action of yeast fungi to all he discovered, in anthrax, sepsis, chicken cholera, hydrophobia, and the many mysteries he solved. Thus from the germ theory sprang the vastest question ever raised in pathology, the rôle of microbes and their toxins in disease.

Pasteur's greatest triumph, even among so many, was that he fired the scientific imagination of Lister and led him to his famous system of the antiseptic treatment of wounds. Lister's previous physiological work, the investigations he carried out on the sterilisation of fluids by heat, along with his genius for original research, made him the man for the hour, and antiseptic and aseptic surgery were born.

It was a long pull from carbolic putty to Listerism, but Listerism made its mark on surgery as no other method of the treatment of wounds had done, mainly because Lister was exact and dogmatic in his teaching, always giving a reason for the faith that inspired his details.

Listerism has been modified; the spray has been abolished, more elaborate precautions are used—gloves, tunics, mouth-wraps, tiled theatres—but the spirit inspiring all this is still the initial one, the combating of the surgically unclean touch and the surgically unclean surroundings of the incision. It is this principle that has made the triumphs of modern surgery possible.

During all his investigations Lister kept asepsis as his aim. He treated the surroundings of wounds, not the wounds themselves, and at a stage in the healing recognised that when the serum had washed out the carbolic an aseptic condition was attained.

Asepsis was thus bound up in Listerism—indeed when one strips off its husks and wrappings, asepsis is revealed. Pasteur used asepsis in his vivisections and bacteriology, passing his forceps through the flame and plugging his tubes with sterilised cotton wool, but he evolved no system for surgery, and thus asepsis did not arise from him but from Lister.

What has come from Lister's work volumes would fail to tell. The triumphs of brain surgery, of abdominal surgery, of intestinal resections, the advances through it in allied branches of surgery, the great subject of bacteriology and all that has arisen and will arise out of it—all has grown from the apparently transcendental work of two men, the one a chemist, the other a physiologist and surgeon.

Vallery-Radot's life of Pasteur, in its second edition now, and with a preface by Professor Osler, tells his great life work graphically and clearly; almost every page reveals his superhuman insight into diseased processes. When Frenchmen in their plebiscite placed Pasteur at the head of their great men they spoke but the truth and honoured themselves in doing it.

Dr. Saleeby has done his work well, and written, apart from some eugenic eccentricities, as clearly and ably as he has done scientifically. Sir Wm. Sinclair's *Semmelweis*, a most able performance, has been already reviewed in our columns. All the three works noted are well worthy the careful study of medical men.

Pasteur and Lister (who is fortunately still with us) have been acclaimed and honoured in their lifetimes; Semmelweis ended his days in gloom and in the misery of insanity. To these three, however, has been accorded the greatest honour and privilege a man could have, in that each could say accurately and modestly—"My work has saved thousands of lives in my lifetime. As time rolls on the thousands will become millions, and this sum-total of beneficence does not include the sufferings I have removed from those dear to them; this is more than recompense for misrepresentation and neglect."

WE regret to announce the death of Dr. John
The late Dr. J. F. Sutherland, M.D., F.R.S.E. Francis Sutherland, Deputy Commissioner in Lunacy for Scotland, which took place at his

residence, Tain, Ross-shire, on the 30th December last. He was born at Lybster, in Caithness, in 1854. He studied medicine at Edinburgh, where he graduated in 1878. Two years later he took the degree of M.D., obtaining a gold medal for his thesis entitled "Hospitals: their History, Construction, and Hygiene." During his university course he attracted the favourable notice of at least two of the professors—Lord Lister and the late Sir Douglas MacLagan—both of whom interested themselves in his career and testified in after years to his promising ability. Soon after graduating he was appointed resident physician to the British Hospital in Paris, where among many life-long friendships he became favourably known to the late Sir John Rose Cormack and the late Honourable Alan Herbert. In 1880 he was appointed Medical Officer to His Majesty's Prison, Glasgow, where during his fifteen years' official service he devoted himself to the study of criminology in its relation to mental disease, inebriety, and degeneracy. His numerous lectures and papers brought him into prominence as an authority on these subjects, and in 1894 he was appointed secretary and member of the Departmental Commission on Habitual Offenders, one of the first of the many subsequent commissions dealing with the social problems of the submerged sections of the population. In 1895 he succeeded Dr John Fraser as Deputy Commissioner in Lunacy, a position which he held at the time of his death. The duties of this office are arduous in respect of the almost continuous travelling and the many discomforts which it entails, but Dr. Sutherland's sanguine temperament, coupled with his physical vigour, enabled him not only to perform them efficiently, but at the same time to pursue his favourite studies and to make extensive contributions to the literature

of his specialty. His official reporting was voluminous, but always suggestive, and directed with unfailing zeal towards the extension and perfecting of the system of boarding out of the insane in Scotland.

His published papers are too numerous to mention. His best known books are the *Ambulance Vade-Mecum*, which has passed through many editions, and *Recidivism: a Problem in Sociology, Psycho-Pathology, and Criminology*. One of his papers, entitled "The Jurisprudence of Intoxication," published in the *Edinburgh Juridical Review*, deserves notice because of its bold and brilliant presentation of a new and significant conception of the subject. It attracted wide notice, but strange to say its advanced teaching appealed more strongly to the legal than to the medical mind.

Dr. Sutherland was the recipient of many honours from foreign learned societies in France, Russia, Spain, and America. He was a keen sportsman and a loyal and affectionate friend. While unusually outspoken in the expression of his opinions, he was yet so genial and so inoffensive that his numerous friendships were extremely catholic, embracing many men of all creeds and political persuasions throughout Scotland. He is survived by a widow, two sons and a daughter. His elder son, Dr. Halliday Sutherland, is the author of a recent book on the *Control and Eradication of Tuberculosis*, and occupies an important position in one of the London institutions for the treatment of tuberculosis.

**The late Dr. Sophia
Jex Blake.**

THE death of Dr. Sophia Jex Blake, which took place at Windydene, Sussex, on 8th January, recalls an episode in the history of the Edinburgh School of Medicine which aroused considerable feeling in medical circles in the early seventies. Those who only know the conditions under which women are enabled to study medicine at the present day find it hard to believe that their first efforts to obtain an entrance into the profession were associated with scenes of rioting, actions for libel, and prolonged litigation, which for the time being divided the citizens of Edinburgh into two bitterly hostile camps.

In this controversy Dr. Jex Blake was the leading protagonist. A woman of outstanding intellectual ability, of strongly held convictions, and of what has come to be known as the "militant" type, she was pre-eminently qualified to lead the campaign which had been started in favour of medical education for women.

When the movement was inaugurated the Edinburgh Medical School was in the zenith of its fame, and it was characteristic of Dr. Jex Blake that she should elect to storm the citadel itself rather than to establish a footing in one or other of the outposts and gradually work her way forward. Into the merits of the controversy it is unnecessary for us to enter now. Time has shown that there is

room for women in the medical profession, although perhaps the field for their activity is more limited than the pioneers of the movement believed. Suffice it for us to put on record that much of the success which has attended the movement was due to the untiring and, it must be admitted, the self-sacrificing efforts of Dr. Sophia Jex Blake.

**Anatomy in Scotland,
1823-1899.**

PROFESSOR ARTHUR KEITH has requested us to insert the following note supplementary to his address on "Anatomy in Scotland during the Lifetime of Sir John Struthers," published in the January number of the *Journal*.

Minto House, the town house of the Elliots of Minto, was converted into a Surgical Hospital by Syme in 1829. About the year 1878 it was demolished, and on its site Mr. Falconer King, an analytical chemist, erected a modern building with accommodation for himself and other extra-mural lecturers. Professor Cossar Ewart gave the first course of Anatomy Lectures (1878-79), and was succeeded by Dr. Johnson Symington in the summer of 1879, who held a lectureship till he was appointed Professor of Anatomy at Queen's College, Belfast, in 1893. He was succeeded by Mr. Alexander Miles, who held the lectureship for two years. Minto House then became the home of the School of Medicine for Women, anatomy being taught there by Dr. J. Ryland Whitaker, until the building was sold and converted into business premises.

The "New School" School of Medicine was founded by a number of extra-mural lecturers in 1894. An anatomical department was built, and Dr. James Musgrove held the lectureship till 1896, when he was appointed Professor of Anatomy at St. Andrews. He was succeeded by Dr. R. J. A. Berry, who held the lectureship till 1905, when he went to Melbourne as Professor of Anatomy. The Anatomical Department in the New School was then leased to the University, and is still used as an annex of the Anatomical Department of the University under Professor Robinson.

**Portrait of Sir William
Turner.**

WE note with particular satisfaction that a fund is being raised to obtain a new portrait of Sir William Turner. This, it is proposed, should become the property of the University, to which Sir William has rendered such brilliant service during a period of nearly sixty years. The Honorary Treasurer of the fund is James Walker, Esq., C.A., 25 Frederick Street, Edinburgh.

ON THE SURGICAL PATHOLOGY OF THE LARGE
INTESTINE, WITH SPECIAL REFERENCE TO
CARCINOMA.*

By D. A. WELSH, M.D., F.R.C.P.(Edin.),
Professor of Pathology in the University of Sydney.

THE growing interdependence of pathology and surgery is a fact of good omen for both. Time was when pathology began and ended in the post-mortem room, but modern pathology is concerned chiefly with ante-mortem processes. The study of disease more often begins, and hence more often ends, with the living patient. A cause and a result of this development is that the practice of surgery, like the practice of medicine, has become more scientific. The successful surgeon of to-day must be not only a good anatomist and physiologist, but above all a pathologist of no mean order.

Incidence of Cancer of the Intestine in Relation to Irritation.—In the unknown causation of cancer there is no factor more obvious, no factor more constant, than irritation,^{1, 2} and the influence of irritation in determining the onset of cancer is nowhere better illustrated than in the intestine, for the sites at which cancer of the intestine is most frequent are just the positions at which irritation of the mucosa is greatest. Now irritation of the intestinal epithelium is conditioned partly by the form and fixity of the channel and partly by the physical state of its contents. The relative immunity from cancer of the small intestine between the duodenum and the ileo-cæcal valve is probably due to the fact that irritation is reduced to a minimum by the easy passage of its semi-fluid contents along a muscular tube of uniform calibre suspended so as to avoid fixed turns. But irritation is induced by the configuration and by the fixation of the tube at the ileo-cæcal valve and at the flexures of the large intestine, and is still more aggravated by the increasing consistence and accumulation of the contents in its lower part; and in the large intestine cancer is common, and is located most often in the sigmoid and rectum, where irritation is at a maximum, and next at the cæcum and flexures.

* A contribution to the opening of a discussion on the surgical diseases of the large intestine at the Ninth Australasian Medical Congress, Sydney, September 1911.

The appendix, however, is seldom the seat of cancer, and yet inflammation and irritation are very common there. This is difficult to reconcile with the known close relation between cancer and irritation, except on the hypothesis that irritative conditions of the appendix do not last long without causing symptoms of urgency, so that death or the surgeon intervenes before a cancer can develop.

It is interesting to note that women are somewhat more liable to carcinoma coli than are men,³ and that women, more often than men, suffer from habitual constipation and the resultant greater irritation of the lower bowel.

The age incidence may be misleading as an indication of cancer of the large intestine, for in this region cancer is not an uncommon cause of obstruction at any age, even in young adults. Probably there is no other delicate epithelium in the human body exposed to such unremitting irritation as the lining of the large intestine, and this may induce a premature senescence of tissue and an earlier genesis of cancer in a certain proportion of cases.

General Characters of Cancer of the Large Intestine—

(a) *Histological*.—Sarcoma is rare; true carcinoma is relatively common. The predominant form is an adeno-carcinoma originating from the epithelium of Lieberkühn's crypts. The adenomatous arrangement is usually of the inverting type, and in most cases there is associated a greater or less degree of "colloid" change in the carcinomatous epithelium. The density and relative amount of the stroma varies in different growths and in different parts of the same growth.

(b) *Anatomical*.—The commoner anatomical forms may be grouped as (a) annular, (b) tubular, (c) fungating, and (d) eccentric, in that order of frequency. In the *annular* forms a narrow ring of dense cancerous new growth invests and constricts the bowel, causing progressive chronic obstruction, which may at any time become acute. In the *tubular* forms a more or less rigid tube of new growth extends several inches along the bowel. The actual narrowing is usually less than in the former type, but the mere rigidity of the tube is contributory to the obstruction. In the *fungating* form softer masses of more rapid growth project and may ulcerate into the lumen, and may or may not give rise to noticeable obstruction. In the *eccentric* form an active proliferation of cancerous tissue is localised in the wall of the bowel, and may come to form a palpable tumour with or without obstruction.

(c) *Clinical*.—The two pathological results that most commonly give a clinical sign are obstruction and tumour. Some degree of obstruction is present in nearly every case, and evidence should be most carefully sought in regard to it, since it is by far the most important indication. Palpation is of less value in diagnosis, except in so far as it may reveal the faecal accumulation above an obstruction, or unless the growth is within reach of the finger in the rectum. Otherwise a palpable tumour is rarely met apart from advanced conditions.

Mode of Spread of Carcinoma of the Large Intestine.—The spread of cancer in the alimentary tract reveals two distinct processes, one of which is not, to my knowledge, recognised. This is the local extension of the cancer by the progressive involvement of adjacent cells in the cancer process. Side by side with the cancerous new growth there can be seen cells of the mucous membrane becoming cancerous *in situ*. Epithelial cells, in process of transition to cancer cells, are seen to become more rounded, the nucleus more central, the cytoplasm more granular, and—most noticeable change of all—the cells acquire an increased affinity for cytoplasmic stains. The appearances are very striking, and are such as to suggest that some malign influence passes by direct contagion from cells already cancerous to healthy cells, gradually transforming them also to cancerous types. Several instances of sarcomatous development in the stroma of experimentally propagated carcinoma might be interpreted in the same sense. It may, however, be that the unknown cause of the cancer process continues to act and to implicate adjacent cells long after the earliest cancer cells have been formed. In any case the local spread of the cancer, *so far as the mucosa is concerned*, would appear to be due to a process of direct extension to contiguous cells rather than to an undermining of the mucosa by an invasion of cancer cells from a focal growth. And, so far as I have been able to see, this holds good for the initial transverse extension in the mucous membrane as well as for the extension in the long axis of the gut.

The other mode of spread is well recognised, and may be described as the *dissemination of cancer cells*, as distinct from the local *extension of the cancer process* indicated above. This dissemination is, in the first instance, local, but tends to become generalised. It is best realised by thinking of a cancerous invasion as analogous to a chronic bacterial infection (*e.g.* tuberculosis), the infective agent being the cancer cell in place of the

bacterium.² It is by this process that the cancer cells invade the deeper layers of the mucosa, penetrate the muscularis, and reach the lymphatics of the subserosa. It is by this process that the cancer cells, following the lymphatic spaces and channels of the intestinal wall, form most commonly an annular investment of the bowel, and come to invade the lymph glands into which the affected segment drains. In all these respects the dissemination of the cancer cells corresponds with the spread of tubercle bacilli in the development of tuberculous ulceration of the intestine. The cancer cell travels by the same spaces and channels as the bacillus; it is deposited and multiplies in the same positions.

The general lymphatic dissemination is most significant for the surgeon. It has recently been shown by Jamieson and Dobson⁴ that the lymphatic drainage of the large intestine follows a certain orderly plan, and by Clogg⁵ that the dissemination of carcinoma coli proceeds on the same anatomical lines. These observations, of great practical importance as well as of scientific interest, have been summarised by Makins,⁶ from whom this account is taken. According to Jamieson and Dobson the entire lymphatic basin of the large intestine is made up of a number of more or less definite "lymphatic areas," and in each lymphatic area there are more or less definite systems of glands through which the lymph stream passes. The main "lymphatic areas" are indicated by the main arterial branches, since the lymphatics of any segment of the colon correspond in their distribution with the arteries supplying that segment. Hence four lymphatic areas may be recognised—(1) *ileo-colic*, (2) *middle colic*, (3) *left colic*, and (4) *inferior mesenteric*. The right colic artery, being inconstant in origin and having few glands along its course, is not assigned an individual area.

The lymph glands connected with each area are divided into four distinct but intercommunicating groups—(1) *epicolic* glands, contained in the appendices epiploicæ and lying on the wall of the bowel; (2) *paracolic* glands, arranged parallel to the mesenteric attachment of the bowel, between the intestine and the arterial arcades and on the arcades; (3) *intermediate* glands, distributed along the trunks of the arteries about midway between their origin and the gut; and (4) *main* glands, grouped around the main trunk of the artery near its origin. The intermediate glands for the most part receive lymphatic vessels from the epicolic and paracolic groups, but some lymphatics may pass to them directly from the bowel itself. The "main" glands collect lymph chiefly from

the three peripheral groups, though in certain regions, notably in the lower part of the inferior mesenteric system, they drain directly from the intestine. The main glands discharge centrally into the lumbar and mesenteric glands, and have lateral connections with other systems, such as the splenic.

The great value of these observations lies in the fact that they indicate the procedure by which complete removal of colic carcinoma is most likely to succeed—by extirpation of the whole lymphatic area involved. They also serve to define the limits within which complete removal is possible, since implication of the main glands makes it probable that the cancerous invasion has extended beyond reach. Moreover, they help to explain how it is that in cancer of the intestine there is a longer period than is usual in cancers elsewhere between the probable onset of the growth and the stage at which complete removal first becomes impossible. This relatively long period of grace would appear to be due partly to the sequence of lymphatic barriers delaying the advance of the cancer cells, notwithstanding occasional short circuiting, and partly to the moderate degree of malignancy inherent in this type of new growth, the cells of which are characterised by a capacity for local penetration rather than for general dispersion. It is important, however, to note that intestinal carcinoma may grow for a long time without being recognised, the signs and symptoms being masked, so that between its recognition and the time limit for successful removal there may be no interval remaining.

Indications for Treatment.—Two great advances in the treatment of carcinoma were made by scientific surgery when it was recognised that removal of the growth should be done earlier and done more thoroughly. Earlier removal was made possible by more careful diagnosis; more use was made of the microscope in doubtful conditions, less trust was put in naked-eye appearances and in expectant methods. More thorough removal became possible when the surgeon acted on the knowledge that every cancer cell he left behind might be the starting-point of further growth; when he learned not to implant cancer cells in the tissues at operation; when he studied the lymphatic drainage of the structures involved in the growth, and tried to excise the whole lymphatic area. In the large intestine peculiar difficulties attend the early recognition of carcinoma, and, as we have seen, it is only within recent years that the anatomical and pathological data for complete removal have been forthcoming.

All work goes to show that the only chance of cure is extirpation—radical and complete. It is true that we are not in a position to say that complete removal is a certain cure of cancer, for it is conceivable that the unknown causes of cancer may continue operative, and may generate a fresh growth near the site from which the original growth was taken; nevertheless in our present state of ignorance it is only right that we should look upon every recurrence of an identical growth as evidence of an incomplete removal rather than a fresh recrudescence. Now complete removal of carcinoma, whether in the colon or otherwise, makes two demands of the surgeon—(1) an early recognition of the need for operation; (2) an operative technique based on a scientific knowledge of the life-history of the cancer cell.

I take it that every surgeon is fully seized of the fact that the best chance of recovery lies in early operation. But early operation depends on the early recognition of what?—of the presence of new growth? I should prefer to say that an operation is indicated as soon as the surgeon is satisfied of the probability of new growth, for in the large intestine there can be no certainty of carcinoma within the period during which complete removal is possible. There is no sign nor symptom diagnostic of cancer, and from this position a portion of suspected growth cannot be submitted to a pathologist. The diagnosis rests on the calculation of a probability, and the first condition of successful surgery is the acumen with which this calculation is made. If the surgeon waits until the probability increases to a certainty he no less surely waits until the chances of successful operation diminish to nil. What I said of cancer at our Congress six years ago is no less true to-day. If there be any doubt give the patient the benefit of the doubt—and operate. In these days of modern surgery an exploratory operation is little more than a trifling and temporary inconvenience.

But however alert the surgeon may be to the fatal consequences of delay, he will from time to time be confronted with more or less advanced cases. It may be that a physician has toyed with the case for some time. More often the patient has neglected to seek help until late in the disease, and there is nothing more tragic than the futility of such endurance. Then complete removal may no longer be possible, or may be possible only by an extensive operation scientifically designed to eradicate all the cells of the growth. Even when it is obvious that removal of a carcinoma cannot be complete it

should be made as complete as possible, for cancer cells do not have an unlimited duration of life. In a few instances they have been known to die out before they have caused the death of their host. Unfortunately this happens only exceptionally; but in dealing with cancer the surgeon should give the patient every chance, even the most exceptional. Hence in an advanced case he should not be satisfied with a perfunctory operation for the relief of obstruction, but should do the most radical extirpation that he and the patient can stand.

Conditions Simulating Carcinoma of the Colon.—Of the conditions that may simulate carcinoma coli there are two most noteworthy—(1) tuberculosis, and (2) chronic inflammation. The particular form taken by a tuberculous infection depends on two main factors—the number and virulence of the bacilli on the one hand and the resistance offered by the affected tissue on the other. The interaction between them probably determines whether the lesion will take the form of a proliferation of tissue terminating in necrosis (*e.g.* hyperplastic tuberculosis) or the form of a more chronic induration leading to contraction of tissue (*e.g.* cicatricial stenosis of the bowel). The anatomical site of the process also conditions the form of the tuberculous lesion. Thus infection from the lumen of the bowel may be concentrated in the submucosa, causing ulceration of the mucous membrane, or the infecting bacilli may pass more deeply into the intestinal wall and lodge in the subserosa, where proliferative changes lead to hyperplasia. But, whether the lesion be mainly cicatricial or mainly hyperplastic, the clinical resemblance to carcinoma is so close as to make the differential diagnosis largely conjectural. This matters little, however, since operative interference is indicated in any case; but when the lesion is exposed to view it becomes important to decide. If it should prove carcinomatous then the corresponding “lymphatic area” should be excised; but if it should be tuberculous a limited excision may be more safely practised, for abdominal tuberculosis differs from pulmonary forms in that it appears to benefit by being stirred up, so that improvement may continue although other tuberculous foci are left behind. The different tissues (abdominal and pulmonary) appear to have different capacities for local resistance, and there may also be differences in the virulence of the infecting bacilli, *e.g.* bovine types in abdominal lesions and human types in pulmonary.

In regard to other chronic inflammatory conditions I have had

no personal experience, and I am indebted to Makins⁷ for the following account:—A few are possibly tuberculous, but most belong to the category of “diverticulitis” of American surgeons. The association of false diverticula of the intestine with obstruction of its lumen was first described by Sydney Jones in 1858, and in more recent years there have been recorded operations on cases in which the signs and symptoms produced by inflammatory conditions have simulated in an extraordinary degree those of malignant disease. Again, the mysterious disappearance after simple exploration of tumours deemed to be malignant and inoperable by surgeons of experience, and the surprising results of colostomy in similar circumstances, all tend to show that inflammatory conditions of the large bowel, giving rise to obstruction, are by no means uncommon (*cf.* Moynihan). In five cases of peridiverticulitis operated upon by W. J. Mayo the disease was found to be limited to from 4 to 8 inches of the gut, and had led to chronic inflammatory thickening, chiefly in the muscularis and subserosa. I would suggest that some of these conditions may really have been carcinomata of an atrophic type, such as are not uncommon in the pyloric region of the stomach. In the older parts of such tumours the epithelial elements may completely disappear and only chronic inflammatory tissue remain, so that unless a thorough microscopic examination is made, involving the outlying parts of the induration, its carcinomatous nature may not be revealed.

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TILTING THE SOLES OF THE BOOTS, AND ITS USE AS A MEANS OF TREATMENT IN VARIOUS COMMON CONDITIONS.

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I VENTURE to publish these few notes on this subject chiefly because I feel that it is not as widely known as its merits deserve, and also because the application of the treatment is very simple and yet extremely efficacious.

Alteration of the plane of the sole by tilting or crooking the boot was first practised and brought into prominence by the late Mr. Thomas, and although the actual method of altering the boots has been somewhat modified by Mr. Robert Jones, the original principles remain unchanged.

In the Thomas boot the waist was completely blocked in, and a wedge of leather which extended from the back of the heel to just behind the bend of the sole, a point just posterior to the heads of the metatarsals, was then adjusted (Fig. 1). The leather wedge was not produced along the whole length of the sole as the latter would have been thereby made too stiff; the purpose of blocking in the waist of the boot was simply to afford greater support to the instep in its altered position.

The obvious disadvantages of this boot were its considerable weight and also its rather noticeable appearance. To obviate these two faults and also to allow for play of the muscles of the sole Mr. Robert Jones now applies separate wedges to the heel and sole, raising the whole length of the heel but only applying a small wedge to the sole, so that the flexibility of the tread is not interfered with. Instead of completely filling in the waist where the ordinary short heel does not sufficiently support the foot the heel is lengthened, and, if necessary, at the same time slightly broadened or skewed on the elevated side (Figs. 2 and 3). The sole and waist of the boot should be hammered on an old iron last, and should not be allowed to take a convex shape. With this modified form of boot, without the filled-in waist, it is essential that it shall be made of strong leather, as there is a considerable tendency for it to sag after the heel has been crooked. The thickness of wedge advisable varies in different cases from

$\frac{1}{8}$ in. to $\frac{1}{3}$ in., though a quarter-inch wedge, if properly applied, is sufficient in the majority.

The method of altering the boots having been thus shortly described, the results of the alterations may now be discussed.

The effect of raising the outer side of the boot is to throw the strain of the body weight somewhat inwards while the patient is standing, and by making him walk, as it does, with the toes turned out, the line of strain in walking is also inclined towards the inner part of the foot. For this same reason—that the patient walks with the toes turned out—the external lateral ligaments of both ankle and knee are relieved of strain and the body weight is largely borne by the outer half of the knee joint.

Where the inner side of the boot is raised we have, of course, just the opposite results to those in the previous case. The body weight is thrown rather to the outer side of the foot in standing, the feet are kept parallel or slightly inturned, so bringing the line of strain in walking through the outer part of the foot, the internal lateral ligaments of ankle and knee are relieved of strain, and the body weight is transmitted mainly through the inner half of the knee joint.

The cases in which the external wedge may be used with advantage are not numerous, but the following two instances may be mentioned:—A small wedge to the outer side of the foot will correct a tendency to intoeing; whether or not it is always a sound line of treatment to correct intoeing will be discussed later. The other instance is in the post-operative treatment of certain talipes equino varus cases. We frequently see patients with this type of club foot who after operation have got quite serviceable feet, but in whom the result is to a large extent marred by the persistence of more or less intoeing. Apart from this intoeing being unsightly it is the position in which a relapse of the varus deformity is most likely to occur. Even though the patient does not actually intoe, a tendency to recurring varus can to a great degree be prevented by tilting the outer side of the boot, for in this way the large part of the body weight is thrown on to the inner side of the foot. I do not for one instant suggest that the intoeing in all these post-operative cases can be cured by an external wedge, for we not seldom see cases where the long axis of the feet lies in an absolutely transverse plane, and in these the statics of the limb are so upset that this line of treatment would have little or no effect. In these cases the deformity must be overcome by an operation, the nature of which will depend on how



FIG. 1.

The original Thomas boot with filled-in waist.



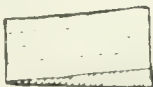
FIG. 2.

Modified Thomas boot. Heel crooked and elongated.



FIG. 3.

Modified Thomas boot. Heel crooked, elongated and skewed.



Cross-section of heel in Fig. 1 or 2, to illustrate application of wedge.



FIG. 4



FIG. 5.

much the intoeing is due to internal rotation at the hip and how much to twisting of the fibula round the tibia.

Just as the external wedge is used for intoeing so the internal wedge can be applied for out-toeing. It certainly is an unfortunate fact that the average parent totally neglects out-toeing in his children, though should they show any tendency to turn their toes inwards an attempt is at once made to try and correct it. This is unfortunate because, although intoeing is an ugly deformity, of the two faults of in and out toeing the former is much less likely to give rise to secondary troubles later on.

To understand what is the ideal position for the feet in walking we have to realise the following points:—The foot is a sort of compound lever made up of a number of parts connected together by what are practically hinge joints whose axis of movement is, roughly speaking, in the long axis of the foot. To preserve the full action of these hinge joints it is obvious that the line of strain, or, in other words, the direction of forward movement of the body, must correspond fairly nearly with the line of the long axis of the foot; any marked deviation between these two lines will throw some of these joints more or less out of action, and will put an untoward strain on those still left in use. If the deviation is great the gait will become stiff owing to the fact that the hinge action of most parts of the foot is in abeyance. Apart from the effect the position of the foot has on its movement, it must be remembered that all parts of the arch of the foot are not equally adapted for strain, for the inner side is mechanically less able to bear weight than the outer. As the results of experiments it has been found that, taking into consideration the movements of the parts and the capabilities of the different parts of the arch to bear strain, the ideal line of strain should pass from the centre of the heel approximately through the head of the third metatarsal. Though progression is, in sum, directly forwards, the body actually swings slightly from side to side as the weight is thrown successively on to each foot, so that the line of strain or direction of swing is somewhat divergent in the two feet. It will be seen from Fig. 4 that if the line of strain is to pass through that part of the foot mentioned above it is necessary for the inner borders of the feet to be kept parallel. Fig. 5 shows how even in a case of moderate out-toeing the strain is thrown quite obliquely across the foot to its inner side. Figs. 6, 7, and 8 are impressions of a normal foot taken in walking, and demonstrate well the effect the position of the long axis of the foot has

in changing the weight distribution. In Fig. 6 the feet are parallel, and it will be noticed that the pressure, the degree of which is indicated by the intensity of the print, is distributed fairly evenly along the heads of all the metatarsals, while all the toes have been brought into use. In Fig. 7 the foot is turned outwards, with the effect that nearly all the weight is thrown on the head of the first metatarsal, and with the further result that the four outer toes are scarcely used at all. In Fig. 8 the toes are turned inwards, and in this case we have the stress on the outer part of the foot, while all the outer toes have been brought into action even more strongly than when the feet are parallel.

Having thus endeavoured to show what the best position of the feet is, treatment of in and out toeing may now be discussed. As was indicated earlier in this paper, we can overcome intoeing by the application of an external wedge, and out-toeing by an internal wedge. I would suggest that any marked degree of out-toeing, especially in children, should be treated on account of its predisposing effect to flat-foot and certain other troubles.

Before making an attempt to cure intoeing in children we must first make certain that the intoeing is not really an attempt on the part of nature to overcome a co-existing deformity such as knock-knee, flat or everted feet. In such cases as these just mentioned it is clear that if we overcome the intoeing, we are really assisting in the aggravation of the more serious deformity. In this type of case we should not be in any hurry to cure the intoeing, but should first tackle the real cause of the intoeing, say the knock-knee for instance, and when it is cured, or when it has reached a stage at which it is unlikely to progress further, the intoeing is easily overcome as above indicated. Where the intoeing is not associated with any other deformity it may be thought advisable to treat it on account of its somewhat unsightly appearance, or because the child is liable to trip. The effect of the treatment must be closely watched, as if it is overdone it will probably give rise to symptoms of strain on the inner side of the foot.

The internal wedge is of the greatest assistance in the treatment of nearly all forms of flat-foot. Almost the only type of flat-foot where it is not applicable is the spastic type, for in these cases the condition is not due to faulty weight-bearing but to muscular spasm, and any attempt to invert the foot causes great discomfort, nor is it likely to be curative. At present the only satisfactory line of treatment in these cases seems to be resection

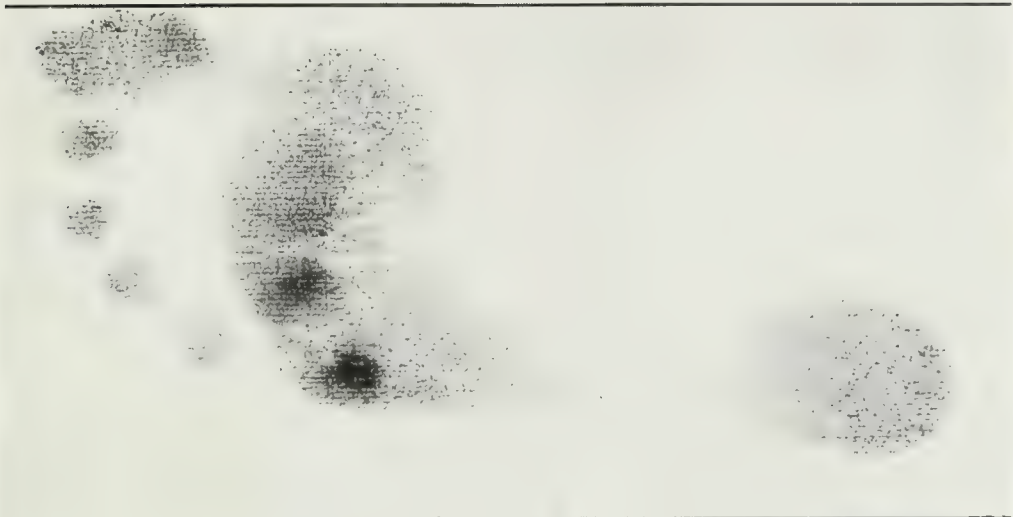


FIG. 8.

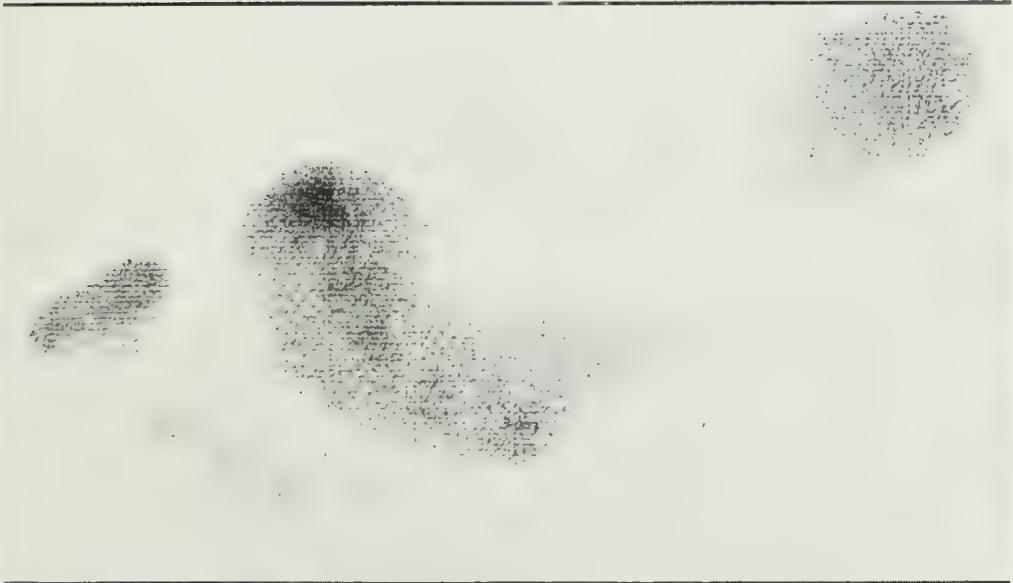


FIG. 7.

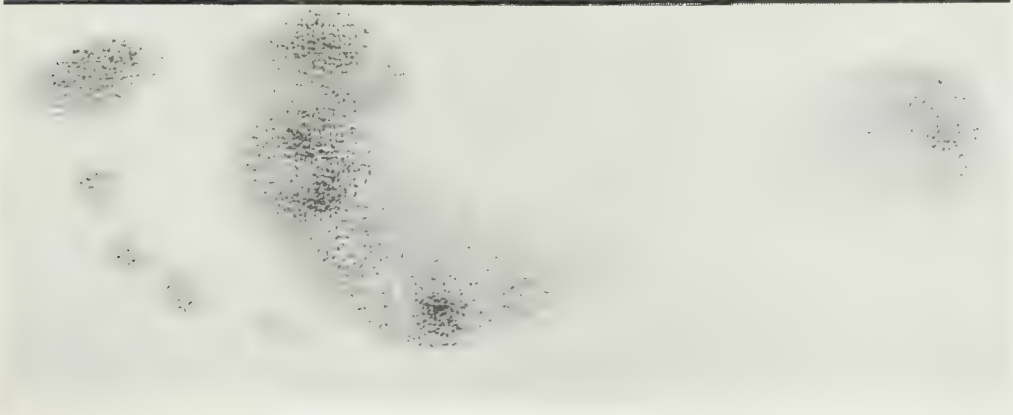


FIG. 6.

of portions of the tendons of both peroneus longus and brevis. The operation may be followed by the application of an internal wedge when the patient starts to walk again to diminish the chance of a recurrence, but, as before remarked, its use is in no sense curative.

From what has been said before it will be easy to see how the internal wedge assists in flat-foot cases, for while muscular weakness is the primary cause of flat-foot, faulty distribution of weight and strain is the strongest predisposing factor. From this it follows that probably the most important part the internally crooked boot plays is in the cure of the out-toeing which is so common in flat-footed persons, and which is bound by the strain it throws on the inner side of the foot to markedly predispose to the collapse of the arch of the foot.

Many medical men are firm believers in some form of instep pad or spring for the treatment of flat-foot, and may object to this crooking of the boots as being unnecessary. The arguments in favour of the Thomas boot or its modifications as against springs or instep pads are as follows:—Firstly, while there are many of the rather more acute forms of flat-foot who are absolutely unable to bear any direct pressure, such as is exerted by a spring, to their arch as it causes so much pain, the great majority of these patients can from the first wear the tilted boots not only without discomfort but with immediate relief from the flat-foot symptoms. Secondly, springs and pads do nothing to correct the faulty position of the feet for weight-bearing and for walking which, as has already been explained, the internal wedge does. Thirdly, footplates, springs, etc., keep constant pressure on the muscles of the sole which, of course, weakens them, and, though they may prevent further collapse, it can hardly be believed that they are able, without being extremely uncomfortable to the patient, to bring about the reconstruction of an arch which has given way. By the application of the internal wedge the foot is kept in a slight but constant varus position which alone, and apart from the fact that the tendons and ligaments on the inner side are so enabled to tighten up, will tend to the reproduction of the natural arch to some extent.

It is impossible to lay down any hard-and-fast rule as to how long a patient should continue to wear the modified boots, for no two cases are exactly alike. Perhaps the best test as to whether the wedges may be discarded or not is to let the patient go back to his ordinary boots for a time and see if he has any recurrence

of the flat-foot symptoms. I notice, however, that patients get such a feeling of support and comfort from the crooked boots that they are in no hurry to discard them, and often prefer to go on wearing them even though the flat-foot symptoms have completely disappeared. A very small wedge will be sufficient to make a patient walk with the feet parallel once the progressive stage of the flat-foot is passed, and should be applied to the walking boots as a merely preventive line of treatment.

The cutting and fixing of the wedges costs very little indeed, and need not necessarily be performed by a surgical bootmaker, both of which points enhance the value of this line of treatment, especially in the case of poor hospital patients.

I need hardly add before dismissing this subject that flat-foot exercises should play an important part in the treatment, as the proper tonicity of the muscles is an essential factor in the cure of the condition.

The internally crooked boots are of distinct value in certain cases of derangement of the internal semilunar cartilage. Displacement and subsequent nipping of the cartilage is said by some authorities on the subject to be almost necessarily dependent on a stretching or rupture of the internal lateral ligament to which the cartilage is normally firmly adherent. (One's clinical experience bears out this point in that first displacements occur either as a result of some degree of violence—when it is associated with pain on pressure over or when strain is thrown on this ligament—or else in patients such as miners, whose habitual working posture tends to stretch this ligament.) Besides the part played by the internal lateral ligament it is common knowledge that external rotation of the tibia on the femur is another almost essential factor in the nipping of the cartilage. Now the internal wedge makes the patient walk with the feet parallel or even intoed, and so both renders the leg less likely to be externally rotated if the toes catch on any object, and also avoids all strain on the internal lateral ligament of the knee, so giving it a chance to either reunite again firmly or to tighten up to its normal healthy state. For these reasons one applies the internal wedge for a time in cases of first displacement, where one expects to get a permanent cure without operation when the patient starts to walk again after having kept the part at rest for the appointed period. Again for the same reasons mentioned above one uses it in cases of what may be called the chronic recurrent type, where for any reason an operation is contra-indicated. In these latter cases one

should usually prescribe what is called a cage splint (a form of hinge splint) for the knee, to limit movement to some extent and to prevent lateral deviation at this joint.

I would in conclusion like to mention the use of the internally crooked boots in early knock-knee cases in which there is not a very aggravated deformity. Slight cases of knock-knee in children up to about the age of three or three and a half may be materially improved by this treatment, unless, as is sometimes the case, nature is already attempting a cure by making the child walk with the toes inturned. More marked cases, early cases where the child is already intoeing, and cases between the age of 3 or 4 and 6 or 7 years are best treated by a knock-knee iron, which is a rigid metal splint extending from the heel to the trochanter, in addition to the internally crooked boots. After the age of 6 or 7 years an operation is nearly always necessary for the correction of the deformity, except in so far as it is due to laxity of the ligaments. The explanation of the treatment is that as the majority of knock-knee patients turn their toes outwards the internal wedge is applied to counteract this fault and so to transfer the weight from the external half of the knee joint to its inner half, and at the same time to relieve the internal lateral ligament of strain. The obvious effect of these changes is to permit of more free and rapid growth of the bony structures on the outer half of the joint. As was mentioned above, the crooked boots and splints avail little after the age of 6 or 7 years, but provided this limit is not passed they are retained till the deformity is overcome and until the lateral ligaments have completely tightened up.

These principles of the treatment of the above conditions by this method of tilting the boots have been entirely gathered during my visits to the clinic of Mr. Robert Jones of Liverpool, and I am deeply indebted to him for being able to publish these notes.

A VISIT TO THE SO-CALLED FOUNTAINS OF HIPPOCRATES IN COS.

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WITH

REMARKS ON THE STATEMENTS OF HIPPOCRATES ON MINERAL SPRINGS.

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WHEN taking part in one of the excellently organised spring cruises of the *R.M.S. Dunottar Castle* the writer landed at Cos on Sunday morning the 23rd April 1911. The island of Cos is situated on the coast of Asia Minor, not far from Halicarnassus. It is some sixty miles in circumference, and while the northern part is fairly flat, a range of mountains attaining a considerable height runs along its southern aspect. The water that arises from the springs we visited flows to the north-east, a fact the importance of which will be evident when the statements of Hippocrates on mineral springs are considered.

The only town now existing on the island is likewise named Cos, and stands at the eastern extremity, facing the continent. This is dominated by the great castle or fortress founded by the Knights of St. John, who held the island from 1315 to 1525. The harbour is now silted up so that no large vessel can enter, but one is landed by means of a rowing boat at a small pier. Attention is immediately attracted by an immense plane tree which overhangs the market-place. The bole forms an exaggerated oval, and measures fully thirty feet round, and from it extend great and wide-spreading branches, supported here and there by pillars of marble (Fig. 1). It was difficult to get near the tree, partly from the crowd of inhabitants thronging round it, partly because of a low wall built pretty close to its stem. In this wall at one point is embedded a stone, bearing an ancient carving of a horse's head (Fig. 2).* The tree is undoubtedly extremely old, and tradition connects it with Hippocrates. Under its shade is a fountain. Close to the market-place is the entrance to the castle, and scattered round were old pieces of ordnance removed

* *Ἱπποκράτης*, "subduer of horses."



FIG. 1. —PLANE TREE OF HIPPOCRATES, MARKET PLACE, COS.



FIG. 2. PLANE TREE, COS.

from the walls and piled up. As the garrison of Turkish soldiers had been taken away for service elsewhere, permission was granted to see it, and, crossing a drawbridge, we wandered over the castle. We noticed that the roof of one of the corridors was mainly composed of pillars laid horizontally, which had probably been got from some Greek temple, possibly even that of Æsculapius, though this is about two miles distant.

Emerging from the town, our way towards this temple lay at first through quaint streets, but we soon gained the open country. The road proved fairly good till close to the precinct. I did not, however, linger on this occasion, having thoroughly explored it on a previous visit. Conducted by a guide we made our way to the fountains of Hippocrates. The first of these we reached after a scramble through green fields and over rocky paths, ever gently ascending in a south and west direction. Our walk thither occupied more than two hours from the time we left the town. The so-called fountain consists of a well-built stone enclosure, which from its appearance might be of Mycenæan architecture. To reach the source one enters a narrow, dark passage, just wide enough for one person, and built of large, oblong, closely-fitted and well-dressed slabs of limestone. Beneath the passage runs a stream of water, conveyed in a conduit of stone and cement. The covering has given way in parts, leaving holes, some of considerable size, necessitating caution in advancing. This passage, after extending for a good many yards, at length opens into a high, vaulted chamber, much resembling in shape a champagne bottle, constructed on the same plan as, though smaller than, the beehive tombs at Mycenæ and elsewhere. There is an opening at the top and a square window at the side. The vault is set in the slope of a hill, so that nothing of the building is visible from without except the entrance to the passage. It is possible, however, by climbing from outside, to reach the level of the window and the upper aperture and look in. A low stone bench runs round the interior of the chamber. The water, which issues in abundance from the spring, is clear and tasteless, yet scarcely so cold as might have been anticipated, as it appears to rise pretty deeply from the bosom of the overshadowing slope. Conducted for several miles in a runnel and aqueduct, it still supplies the town of Cos, and apparently also did, the temple of Æsculapius.

Interesting, however, as this fountain was, our real objective was another spring concerning which I had heard from Dr.

Richard Caton, the well-known authority on the shrines of Æsculapius. He indeed was of the party, and would have accompanied us on our walk, but he wished to make some measurements and further observations at the temple and precinct itself. This source is much less known, and is seldom visited, for it lies much further up the mountain side. In proceeding to it we ascended to the right from the first fountain, and after a rough walk of about an hour more we reached the medicinal well of Hippocrates or so-called "red water spring." This arises in a flat inclosure located on a terrace on the northern aspect of the mountain. It is surrounded by a low wall for which no high antiquity can, in our opinion, be claimed. The space is quadrangular, and as far as could be estimated by the eye had an extent of about a quarter of an acre or thereby. It was swampy with some pools of stagnant water. Those most distant from the source were stained a dull red colour, hence the popular designation. Five large plane trees grew inside the retaining wall. The fountain of supply is at the upper end of the inclosure. There is an arched recess under which a spring wells out, forming a pool of clear water one foot in depth. The water as it issued from the ground was perfectly transparent and colourless, and had a bitter, alkaline, somewhat astringent, taste. The spring was evidently regarded with much respect from the care exercised in protecting it from pollution by men or animals. We observed that part at least of the soil in the neighbourhood was reddish in character. The land near was well cultivated. Having secured specimens of the water in carefully cleansed bottles, we wended our way back to the harbour. The return journey occupied two hours, and on our way we descended into and crossed two deep ravines.

The analysis of the water from this upper spring, kindly made for me by Dr. Ritchie, Superintendent of the Laboratory of the Royal College of Physicians of Edinburgh, is as follows:—

Reaction Alkaline.				Parts per 100,000.
Total solid residue	.	.	.	137·00
Volatile residue	.	.	.	27·00
Saline residue	.	.	.	110·00
Chlorine	.	.	.	4·00
Silica	.	.	.	1·66
Lime (CaO)	.	.	.	35·46
Magnesia (MgO)	.	.	.	12·46
Sulphuric Anhydride	.	.	.	19·90
Iron	.	.	.	slight traces
(There were some small clumps of iron bacteria present.)				



FIG. 3.—ENTRANCE TO LOWER WELL OF HIPPOCRATES, COS.



FIG. 4.—ENCLOSURE ROUND RED WATER SPRING, COS.

Dr. Ritchie remarks that "a good many of the salts were probably in the form of carbonates. If the sulphuric acid were united with the magnesia and part of the soda the resulting combination would be mildly aperient and slightly diuretic. The large quantity of lime may seem remarkable, but the geology of the Island of Cos explains it, as it is little else than a mass of limestone. It probably existed in the state of carbonate, since there was considerable effervescence on the addition of hydrochloric acid in process of analysis. The bitter taste is partially ascribable to the sulphates present. The red colour of the stagnant water under the lime trees apart from the spring may be accounted for by growth of iron bacteria."

While balneotherapy is one of the great resources of Hippocrates, being advocated even in acute diseases like pneumonia, the internal use of mineral waters for their special physical properties is only very briefly adverted to by him. The bath in pneumonia, for example, was to be taken once or twice in a day (*vide* Hippocrates, *Regimen in Acute Diseases*). It was administered by pouring water at various temperatures upon the patient's body and having him well rubbed down with soap and sponges instead of by the usual strigil. In such a case the benefits to be derived were, as Hippocrates states, elaboration of the sputa, promotion of expectoration, improvement of breathing, alleviation of weariness, soothing of the joints and skin, diuresis, removal of headache, and moistening of the nose.

At a period more than four centuries after Hippocrates, Pliny, in his *Natural History*, gave a most interesting account of the thermal springs known to the ancients which is full of curious details and speculations (Pliny, *Hist. Nat.*, bk. xxxi.); and a little later Oribasius (326-403 A.D.), in his *Compilations*, furnishes an elaborate account of the various kinds of diseases for which different mineral and thermal waters were employed by the Romans and their dependent peoples (Oribasius, *Compilations*, bk. x.). His account of these waters and baths is taken from Antyllus, a medical writer who lived at the most flourishing time of the Roman Empire, about 150 A.D.

Hippocrates, however, makes only a passing reference to mineral springs, when he speaks of them (*Treatise on Airs, Waters, and Places*) as being second only to marshy waters in badness. "Next to these," he says, "in badness are those waters which have their fountains in rocks, so that they must, of necessity, be hard; or come from a soil that produces thermal waters, such as those

having iron, copper, silver, gold, sulphur, alum, bitumen, or soda in them; for all these are formed by the force of heat. Good waters cannot proceed from such a soil, but those that are hard and of a heating nature, difficult to pass by urine, and difficult of evacuation by the bowels. The best are those that flow from elevated grounds and hills of earth. These are sweet, clear, and can bear a little wine; they are hot in summer and cold in winter, for such necessarily must be the waters from deep wells. Those are most commendable that run towards the rising of the sun, and especially of the summer sun, for they are necessarily clearer, more fragrant, and lighter."

So far as we know this reference is the only one in the works of Hippocrates to chalybeate water, and it is to be noted that he does not speak favourably of it. He admits, however, that some people whose bellies are soft, loose, and affected by phlegm should choose the hardest, the crudest, and the saltiest waters, for by these they are most readily dried up. It is interesting in this connection to note that the analysis of the water from the red spring in Cos shows it to contain so little iron that this would have been inappreciable in the time of Hippocrates, and the absence of iron from the spring was inevitable if the tradition be true which asserts its waters to have been prescribed regularly by the Father of Medicine.

Another point of interest with regard to any water that might have been chosen for use by Hippocrates is the direction in which the source faces. As he believed that the morning sunshine had a great deal to do with clarifying and purifying water, so he held that the best direction for a rivulet or spring was to look towards the rising sun at the summer solstice, or roughly speaking, east north-east. He does not, in the course of his works, mention any one definite spring in Cos or elsewhere, and we can only verify the truth of the tradition that this particular spring was used by him in so far as the nature and situation of this spring correspond to the conditions which he describes as ideal. This red water spring with its emergent stream looks somewhat to the north of east, and so corresponds to what Hippocrates considers the most suitable kind of water, viz. that which runs towards the rising of the summer sun.

The best of all water for drinking purposes Hippocrates considered to be rain water, because this is the lightest, thinnest, sweetest, and clearest of all; but he admits that nevertheless rain water must be boiled and strained, otherwise it may have a bad

smell, and occasion hoarseness of the voice. He was rather chary about the administration of water internally in large quantities during the course of acute diseases, which he treated mainly by a simple diet of barley water and honey water. When, as a change from these, he had recourse to plain water, he preferred to have it mixed with a little light wine. The proportion of wine was, however, very slight, and it was apparently added to the water simply as a flavouring agent and stomachic. The smallness of the quantity required for flavouring and for the removal of the insipidity that draughts of plain water might have had for the palate of a fevered patient may be gauged from a remark made by Galen, who follows Hippocrates in all things. On one occasion he was treating a patient by draughts of wine and water. Another physician came upon the scene, probably by way of holding a consultation, and discussed the various measures that had been adopted for the patient's benefit. His attention being drawn to the wine and water that the patient was imbibing, he observed in a bantering way: "Your patient will have the pleasure of seeing the wine indeed, but he will not be able to taste it." As one of the necessities for avoiding a harsh or mineral water Hippocrates remarks upon the difficulty of mixing it with wine, and we may conclude that for his patients the Coan physician was most careful to specify a water that was either very soft, like rain water, or that came from a spring carefully selected for the possession of similar qualities.

Hippocrates gives the first account in medicine of stone in the bladder, a condition which he attributes to the indiscriminate drinking of all sorts of water, supposing that the stones are actually formed in a process of inflammation of the bladder from the mud and sand that is precipitated from the drinking water.

Enough has been said to show that with Hippocrates the choice of a water supply was a most important consideration, and as the nature of the water from the medicinal spring at Cos, to which tradition attaches the name of the Father of Medicine, corresponds to those qualities upon which he has laid so much stress, we may conclude that in this instance tradition is probably correct.

ANEURYSM OF THE HEPATIC ARTERY.

By GEORGE DEAN and A. W. FALCONER,
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THE comparative rarity of aneurysm of the hepatic artery, and the fact that although it presents a fairly characteristic clinical picture no case has yet been correctly diagnosed before operation, make it desirable that all cases should be recorded. That a correct diagnosis is no mere academic question has already been shown by Kehr, who in such a case ligatured the common hepatic artery with success. In all there are some 50 recorded cases of aneurysm of the hepatic artery, but as during the last few years analyses have been published by Grunert, Rolland, Bickhardt and Schumann, Kehr, Villandre, Tuffier, and Zesas, it is unnecessary to enter into a detailed account of the symptomatology. Grunert was one of the first to emphasise the close association of aneurysm of the hepatic artery with acute infective diseases, more especially pneumonia, acute osteomyelitis, and typhoid fever. He considers that 73 per cent. of the 34 cases collected by himself were sequelæ of previous infective conditions, and the more recent observations have fully borne out his contention. In his own case jaundice appeared on the 20th day after a croupous pneumonia and continued till death a year later. This occurred after an exploratory operation at which the aneurysm was discovered. In Hale White's case, jaundice appeared on the 20th day following a pneumonia, which terminated by lysis lasting from the 8th to the 11th day. The patient died from a rupture of the aneurysm on the 34th day from the commencement of the pneumonia. In all, eight cases, not including the following one, seem to have been definitely associated with pneumonia.

The following case was admitted into the Aberdeen Royal Infirmary under Dr. Edmond, to whom we are indebted for permission to publish the clinical history:—

Male, aged 22, admitted on the 15th November 1910 suffering from acute lobar pneumonia affecting the left base. His previous history showed that at the age of 16 he had suffered from pneumonia, from which he made a complete recovery. At the age of 18 he suffered from blood poisoning in the left arm and shoulder, and had an abscess opened below the left clavicle. At 21 he had an operation for appendicitis, and was laid up for 7 weeks. He had

never had venereal disease. On the day before admission to the Infirmary he had a rigor, and after admission he passed through a typical attack of croupous pneumonia, with the physical signs of consolidation at the left base. On the 7th day of the disease the temperature fell by crisis, and thereafter remained normal. The physical signs at the left base rapidly cleared up, and on 13th December 1910 he was discharged feeling quite well. After he went home he continued well, and started work on 14th January 1911. For a week he felt able for his work, but during the second week of work he began to feel weak and tired. On the 25th January he noticed that his stools were pale and his urine of a deep port-wine colour. On 26th January he suddenly developed a severe pain in his abdomen, which compelled him to stop at mid-day and go to bed. The pain was constant, but was somewhat relieved when he went to bed. It was situated in the epigastrium and passed up to the sternum in the middle line. Accompanying the pain there was a feeling of heaviness and dizziness but no sickness or vomiting. The pain continued throughout the 27th January, and on the 28th he was told by his doctor that he had jaundice. For the next week he remained more or less in bed, suffering a good deal from pain in the epigastrium. On the 5th February he was suddenly seized by a severe pain in the epigastrium, and a few minutes later he vomited about half a teacupful of bright red blood. Almost immediately afterwards the bowels moved, and the motion was quite black and streaked with red blood. The vomiting and the motion of the bowels appeared to relieve the pain, and he remained free from pain for the rest of the day. During the early part of the night he had some more pain, accompanied by a feeling of sickness and dizziness, and at 2.30 A.M. on the 6th he had another acute attack of pain, and brought up a large amount of blood. The bowels again moved and the motion was deeply blood stained. After the vomiting the pain was again relieved, and he remained free from pain till 5 A.M., when he took a cup of tea, which was followed by severe pain, hæmatemesis, and melæna. The pain came on very suddenly, was situated in the neighbourhood of the umbilicus, and sometimes shot through to the back. He was admitted to the Infirmary on the morning of the 6th February. On admission he was found to be quite conscious but very weak. The pulse was 96 and the respirations 22 a minute. The temperature was 98.6° F. He was markedly jaundiced. The abdomen moved well with respiration, and there was no distension nor rigidity. There was

some tenderness in the epigastrium and over the region of the gall-bladder. No tumour could be felt. The liver dulness extended in the nipple line from the upper border of the 7th rib to the costal margin. The urine contained bile and a trace of albumen. There were no leucine or tyrosine crystals in the urine. He was placed upon rectal feeding. The patient was fairly comfortable throughout the day, but passed a restless night, with some epigastric pain. At 10.30 A.M. on the 7th he had another attack of severe pain accompanied by hæmatemesis, and a motion consisting of almost pure blood. Throughout the day he had two similar attacks, and in the evening it was noted that there was extreme tenderness and some rigidity in the epigastrium. He died at 8 A.M. on the 8th February.

Autopsy.—*The following notes are extracted from the post-mortem report.*—The body was that of a tall, rather slightly built, young man, and was well nourished. The skin and conjunctivæ were deeply bile stained. Cicatrices were present over the appendix region corresponding to the operation referred to in the history. The subcutaneous tissues and all the viscera were bile stained.

Heart (10 ozs.) showed slight milky opacity of endocardium of left ventricle. A few small atheromatous patches were present in the aorta above the aortic valve. The organ was otherwise normal.

Lungs.—L. There were a few old fibrous adhesions posteriorly. R. Similar adhesions with cicatricial thickening of the pleura were present at the apex. Both lungs were emphysematous at the margins, causing some overlapping of the heart, and were congested at the bases. The mucous membrane of the bronchi was normal. The bronchial glands were slightly enlarged, indurated, and pigmented.

Peritoneum.—A few old fibrous adhesions were present between the caput cæcum and the peritoneum adjacent to the cicatrix from the appendix operation.

Alimentary Canal.—The stomach and intestine contained some partially digested blood. The mucous membrane was coated with mucus. There were a few fibrous adhesions between the liver, the pancreas, the diaphragm, and the gut. The liver and pancreas were removed together, and weighed 5 lbs. 6 ozs. The glands at the hilum of liver were enlarged and indurated.

The liver appeared to be of normal size and weight. The gall-bladder was moderately distended. The cystic duct was tortuous

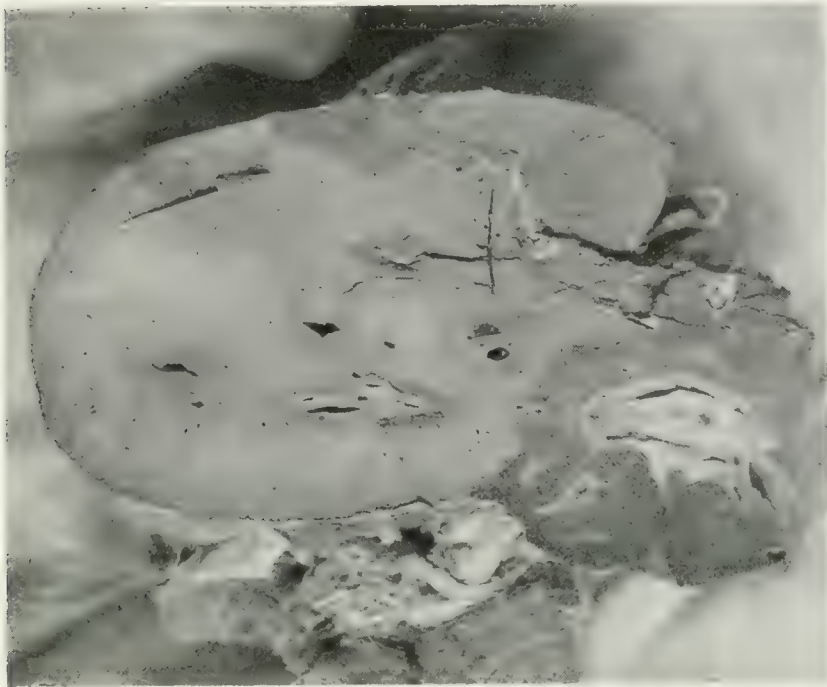


FIG. 2. Section through the right lobe of the liver. To the right is seen the deeply bile-stained area, to the left the normal area, and above and to the right the normal liver tissue.

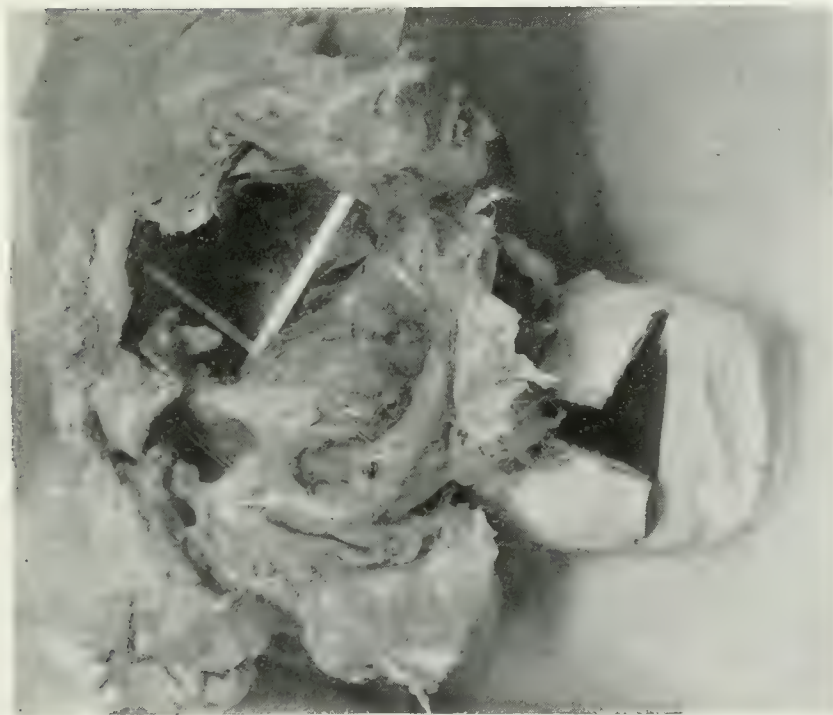


FIG. 1. Photograph showing the gallbladder below; above and to the right the largest and irregular cavity, with the two smaller cavities on the left.

and distended in part to the size of the little finger. The common bile-duct, near the liver, was about the thickness of the forefinger. In the hilum were a number of enlarged glands, the largest being about the size of an acorn.

Midway between the anterior and posterior borders and to the right of the hilum was a slightly bulging swelling. On opening this it was found to contain what appeared to be almost pure blood-clot. The lining of the cavity was found to consist of a laminated fibrinous thrombus. The sac was multilocular, the largest of the cavities having these measurements— $1\frac{1}{2}$ ins. in its antero-posterior diameter and $1\frac{1}{4}$ ins. transversely, and was roughly rounded in outline. Two small chambers projecting from the main sac were about the size of hazel nuts. One of these pouches projected to the left side of the hilum, and into this cavity it was found that the hepatic artery opened and that the walls of the cavity and of the vessel were continuous; the cavity was, therefore, an aneurysm of the hepatic artery.

The vessel chiefly involved was the right hepatic artery, but from one part of the sac it was found that the left hepatic artery had its origin, so that the aneurysm must have originated in the hepatic artery close to its division. The cavity was found to have ruptured into the right division of the hepatic duct, the opening being large enough to allow the passage of a goose quill. It was obviously through this opening that the blood had escaped into the bile-duct. The tumour was adherent to, and pressed on, the cystic duct so as almost to obliterate it, but as the gall-bladder contained a large amount of blood-clot, there must have been a small opening left through which the blood had regurgitated. The opening of the common bile-duct at the papilla in the duodenum was patent, a probe passing freely through it; but above the opening the biliary vie were all considerably dilated. The pancreatic duct, which opened into the common bile-duct about half an inch above its orifice, was also dilated and distended with blood, probably mixed with bile. The dilatation of the biliary vie below the aneurysm indicates that some retention must have been present, and this was probably due to the sticking of a blood-clot near the papilla.

There was an area in the right lobe of the liver which was apparently in a condition of necrosis. It was sharply demarcated from what appeared to be normal liver and from certain other deeply bile-stained areas. The necrosed part was dry, anæmic, and of a pale yellowish-grey colour, and it occupied about two-

thirds of the right lobe. The part nearest the right border was not uniformly necrotic, patches of more or less normal healthy liver running into the necrotic area.

The *pancreas* was enlarged and of a deep red colour, and was engorged with blood. There was no evidence of fat necrosis in the abdomen.

Kidneys.—With the exception of considerable pallor, these showed nothing abnormal.

Spleen.—Was rather small, weighing 4 ozs. It showed evidence of old perisplenitis. The Malpighian bodies and trabeculae were normal.

Cause of Death.—Hæmorrhage from rupture of hepatic aneurysm.

Histological Examination.—*The Aneurysm*.—On section the wall shows on the inside a laminated fibrinous thrombus. The wall consists of fibrous tissue, for the most part dense and fully formed, but in it are numerous foci of round cells, consisting of fibroblasts, lymphocytes, and polymorphonuclear leucocytes. There is also a considerable amount of elastic tissue. In the outer part of the wall can be seen numerous bile ducts, which are frequently flattened and tortuous with numerous foldings of the epithelial lining. Many of these bile ducts are packed full of red blood cells and leucocytes. In the vicinity of the sac are numerous islands of small round cells, similar to those described later in connection with Glisson's capsule. There are also present in the fibrous tissue round about the sac, vessels and nerves. The smaller branches of the hepatic artery show irregular thickening of the tunica intima, the thickening consisting of delicate young connective tissue with round cells, among which are a few polymorphonuclear leucocytes.

Some of the arteries are filled with organising thrombus. Many of the veins are thrombosed, and present a very interesting appearance. They are very much dilated, so that on section they resemble a cavernous angioma. These venous spaces are thrombosed, the thrombus consisting almost entirely of cells. The predominant cells are endothelial cells and large and small mononuclear cells, but there are also present a considerable number of polymorphonuclear leucocytes. A little granular fibrin containing blood platelets occurs in small patches among the cells. There is no evidence of fibrous tissue formation in these venous thrombi.

The liver cells in contact with the sac are flattened and atrophied, and in this region there are hæmorrhages into the liver

tissue. At the point of rupture into the bile-duct there is a small thrombus, closely resembling in appearance an organising endocardial thrombus, having a deposit of fibrin on the surface and a fibrocellular base. The wall of the hepatic artery and of the hepatic vein showed similar cellular foci to those found in the wall of the sac.

The Large Necrotic Area in the Liver.—The necrotic areas are at parts fairly sharply demarcated on the one hand from the normal liver, and on the other hand from the deeply bile-stained areas; at other parts normal lobules project into the necrotic area. There is no zone of reaction. With the low power the cells are seen to be much paler than the normal cells in the vicinity. With a higher magnification the nuclei are seen to be still capable of taking on a certain amount of nuclear stain, but the staining is fainter than in the normal cells. The protoplasmic changes are more marked than the nuclear. In the case of many of the cells there is considerable shrinking, accompanied by irregularity of outline. The protoplasm stains very faintly, and numerous fatty globules are scattered throughout the cells. The type of necrosis is that referred to by Kretz (1904) in which the destructive changes affect chiefly the protoplasm, the nuclear staining being retained.

Scattered throughout the large necrotic areas, and also elsewhere in the liver, are to be seen a few cyst-like cavities, about the size of one or two liver lobules. Some of these are lined by flattened liver cells, covered with some débris; others have an irregular lining of young connective tissue, containing a few leucocytes, but there is little approach to a definite cyst wall in any of them. These, though they are smaller, resemble the cysts described by Reichmann (1910) in the necrotic tissues in his case of hepatic aneurysm. Certain rounded necrotic areas of similar size and outline appear to be a stage in the histogenesis of these cyst-like cavities. The necrosis in these is more advanced than in the other necrotic parts of the liver. The liver cells have almost entirely disappeared, and their remains lie in a meshwork of delicate connective tissue and shrunken capillaries. There are also present a few polymorphonuclear and mononuclear leucocytes. These focal necroses belong to the type in which not only is the protoplasm changed but the nucleus has lost its staining properties. In certain parts of the sections there are evidences of division and multiplication of the liver cells, indicating an attempt at compensatory regeneration of the liver.

The Bile-Stained Areas.—In these areas there is a large amount of bile pigment deposited in the endothelium and in the liver cells, chiefly in the central part of the lobules. Some of the cells in this part of the lobule show evidence of necrosis, being altered in outline, frequently oval, and with the nuclei showing karyolysis.

A few Gram-positive cocci, often in diplococcal form, were scattered throughout the tissues, especially in the region of cellular areas.

Connective Tissues of Liver.—The capsule is slightly thickened over the aneurysm.

Glisson's Capsule.—There is distinct evidence of an early stage of interstitial hepatitis. The new connective tissue is in the round and spindle-cell stage. In addition to the fibroblasts in the cellular foci, both in the Glisson's capsule and in its extensions into and between the liver lobules, there are fairly numerous polymorphonuclear leucocytes and lymphocytes. In some of these islands a few atrophied liver cells are present. The bile ducts in the Glisson's capsule are in many cases filled with blood.

Lymph Gland from Hilum of Liver.—The lymph glands show a large number of desquamating and endothelial cells from the walls of the sinuses. These are large, oval, irregularly rounded cells, many of them containing granular reddish-yellow pigment, which make them striking objects in the histological picture. A few of them contain fat globules. There is some proliferation of the reticular cells. The appearances suggest the recent occurrence of a lymphadenitis.

Pancreas.—The blood-vessels are engorged and several microscopical hæmorrhages are visible. Outside the vessels and scattered throughout the sections are many polymorphonuclear leucocytes, generally singly or in small numbers, but in a few instances in rather larger groups. In these there are also a few lymphocytes.

Kidney.—Shows no marked histological changes.

In this case there are so many morbid changes that it is difficult to form a definite opinion as to the sequence of events giving rise to the various lesions. Many of the changes point to the primary cause having been an acute infective process.

It is difficult to decide how much weight ought to be attached to the finding of Gram-positive cocci, because it was impossible to isolate in pure culture the organisms present, the plates being overgrown by a number of organisms, among them the *B. coli communis* being predominant.

It is possible that the diplococci present are pneumococci which have persisted from the pneumonia. Apart from this, however, the histological picture points to an infective process. The enlarged lymph glands at the hilum give evidence of having been the site of a recent extensive lymphadenitis. The thickening and cellular deposits, including polymorphonuclear leucocytes, of the walls of the vessels and the cellular thrombi in the veins, also point in the same direction. How far the presence of similar cellular deposits in and extending from the Glisson's capsule indicates an infective process is a matter of doubt, since it was shown experimentally by several workers (Takashi Tsunoda, 1910) that blocking of the bile-ducts produces in its early stages a similar histological picture, including the presence, among other cells, of polymorphonuclear leucocytes. In regard to the necrotic areas in the liver it seems probable that these are due to a combination of toxic effects and interference with the circulation. There is no evidence, from the history or from the lesions, of tubercle or syphilis. The pleuritic adhesions were probably due to the two previous attacks of pneumonia. The dilatation of the biliary viæ below the aneurysm can be reasonably accounted for by the partial blocking of the common bile-duct near its opening in the duodenum by means of a blood-clot or a particle of thrombus from the aneurysm sac.

The bile-stained areas of the liver are no doubt caused by the pressure of the aneurysm on certain branches of the bile-duct.

The acute pancreatitis can be explained by the regurgitation of bile mixed with blood along the pancreatic duct.

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CLINICAL RECORDS.

TWO CASES OF INTRA-NASAL CARCINOMA.

By DAVID M. GREIG, C.M., F.R.C.S.,

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WHILE giving in detail notes of a case of intra-nasal carcinoma in a woman, aged 43, Dr. Harvey Pirie and Mr. Scot Skirving, in the *Edinburgh Medical Journal* for 1911 (vol. xi. p. 306) give a résumé of the characteristics of this comparatively rare condition. The possession of a macerated skull taken from one who died of intra-nasal carcinoma and notes of this and another case enable me to supplement those already published by two additional cases.

Two years ago my colleague in the Dundee Royal Infirmary, Mr. G. T. Guild, transferred to my care a musician, aged 63. His family and personal history so far as he had given it was unimportant. He was married and had five healthy children, all grown up. I remembered, however, that in 1890, some time after the birth of his youngest child, he consulted me on one occasion for recently acquired syphilis, for which he was under treatment for quite an inadequate period, and that for long afterwards he was much troubled with iritis and consequent ocular disturbance. He had been a hard worker all his life, and though, I believe, in the main temperate, may have occasionally indulged to excess. For the past fifteen years he had been troubled with dyspepsia. In 1907 he had "influenza," for which he was a month in bed, his chief symptoms apparently being pains in the head, and during one week this was accompanied by deafness. He apparently made a perfect recovery and was able to return to work.

In the early autumn of 1909 he began to complain of severe pains in the head, and found that his sight was beginning to fail. The hope that relief would be obtained by attention to the eyes proved futile, and the pains increased in severity. From being frontal they became also occipital, and at times he was dazed and stupid and did not know where he was, but he suffered from no delirium. Two months later (October 1909) the eyelids became much swollen, a tumour appeared at the root of the nose and was accompanied by some nasal discharge and epiphora. Towards the middle of November he had to give up work altogether and became confined to the house. It was towards the end of the same month that he came under my observation. There was then a good deal of mental disturbance, with marked lassitude and mental torpor, and at times a good deal of wandering. Both eyelids were much

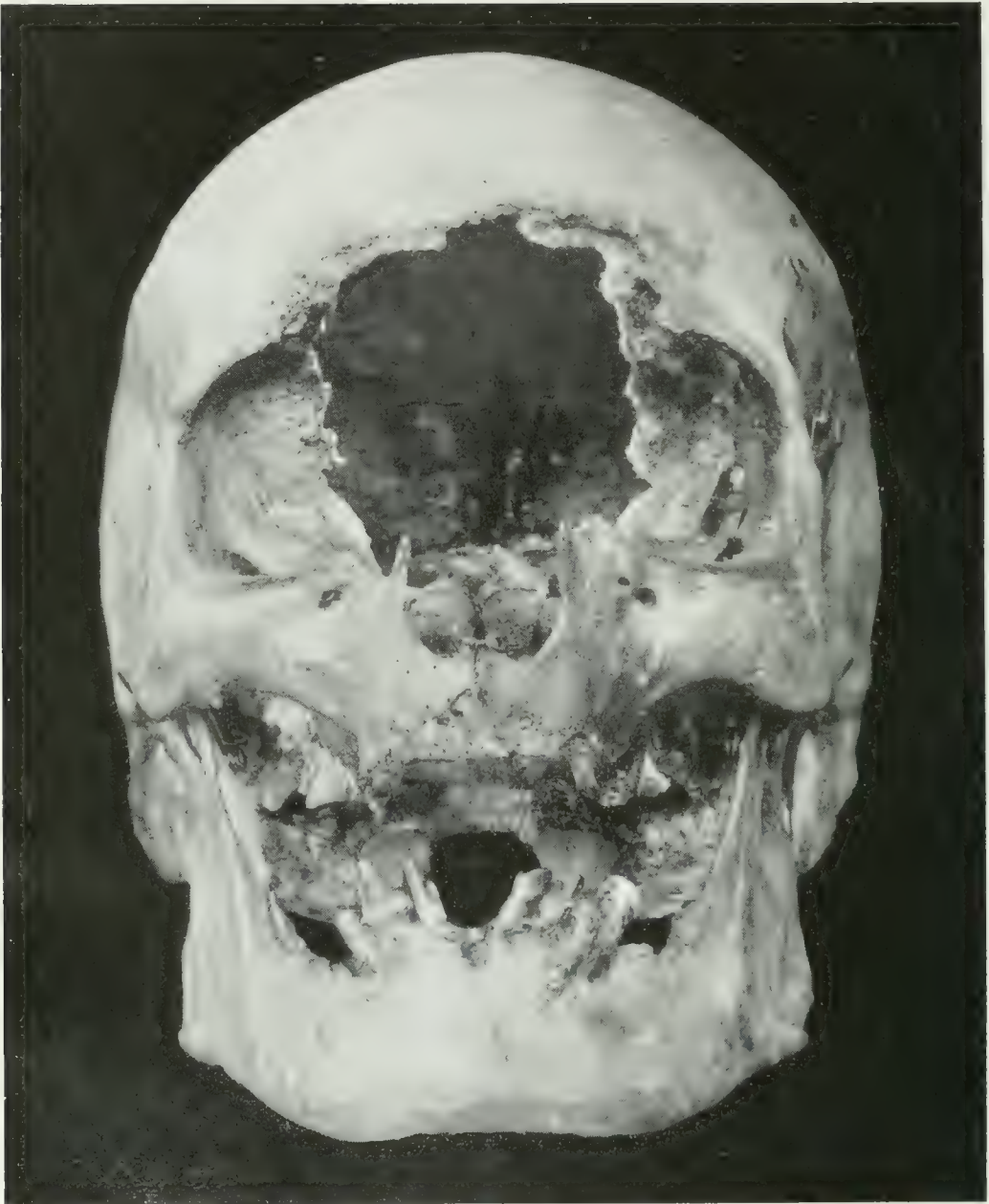


FIG. 1.

Skull (male, aet. 63) showing destruction of bone caused by intra-nasal carcinoma, probably commencing in the frontal sinuses.

swollen and there was slight proptosis. The inter-orbital region and the root of the nose was occupied by a soft purple tumour, obviously very vascular, and with many distinct telangiectases, and here and there larger venules. On raising the eyelids it was obvious that there was no power in the ocular muscles, the eyeballs being fixed in a position of external strabismus. The pupils were moderately dilated and did not react to light, nor was there any evidence of vision in either eye. It was obvious that eradication of the growth was impossible, and during the fortnight he was under my observation the tumour increased very rapidly. About the middle of December a photograph was taken of his appearance after a small part of the growth had been removed for examination. This was reported by Professor Sutherland to be a carcinoma, and from its softness and vascularity seemed of pretty rapid growth. Epithelial carcinoma cell-nests were conspicuous by their absence—a condition which is characteristic of this affection, as it is of carcinoma occurring in the antrum of Highmore. The removal of part of the tumour was followed by considerable mental improvement, though this did not last very long. A general cachectic condition set in, and from this he died a month later. There was no glandular involvement nor any sign of metastatic affection.

Any part of the nasal cavity and its accessory cells may be the site of a carcinomatous growth such as the above. From the way in which the disease commenced—the severe headaches, the initial swelling about the glabella, followed rapidly by œdema of both eyelids—I think it likely that the tumour started in the frontal sinuses. Perhaps a more particular post-mortem investigation might have made this more certain, but I decided that the skull, macerated to show the amount of destruction of bone possible in such cases, would be a rarer specimen and of more general interest than sections and a minute pathological examination (Fig. 1). The destruction of the osseous tissue is extensive and obviously symmetrical. The frontal sinuses have been destroyed in their entirety. An equal destruction of both orbits has taken place, and the nasal cavity has been destroyed except its floor. The antra of both superior maxillæ were opened and partially destroyed, as also were the sphenoidal cells. There is no attempt at the formation of new bone, an indication that the destroying element has been much in excess of the inflammatory.

My second case was that of a male, aged 29, well formed and healthy to appearance, but who was stated to have been always below the intellectual average. He was admitted to my ward in the Dundee Royal Infirmary on the 3rd of May 1895 on account of a recurrent epistaxis of five weeks' duration. Before that I had seen him in the out-patient department, his complaint being inability to breathe through the right nostril. This had then existed for two weeks, with gradual increasing obstruction and occasional right epistaxis and hæmorrhage

from the pharynx. The right nostril was seen to be blocked posteriorly by a dark hæmorrhagic mass. After my inspection and before his admission to hospital he consulted a medical man, who made some slight and ineffectual attempt to remove a "polypus." This interference was accompanied by considerable pain and followed by an epistaxis which lasted twenty-four hours. Some inflammation supervened and the growth rapidly increased, filling the nostril entirely and coming down under the right upper lip on to the gum, which became swollen and soft. Under the impression that he had a gumboil two teeth had been extracted, but this was not followed by any improvement. On admission his defective cerebation was noticeable. The right nostril was dilated and the right upper lip swollen, the swelling corresponding in extent with that on the gum. An occasional hæmorrhage followed during the next day or two and was arrested by plugging the anterior nares and by the application of ice. A few days later the skin and conjunctivæ were distinctly jaundiced and an induration appeared in the left mamma. This metastasis lay immediately beneath and was slightly more extensive than the areola. A careful examination disclosed a soft, vague, and diffuse infiltration of the lower border of the left pectoralis major two inches from its insertion, and a node was discovered on the right parietal bone near the vertex, painful to pressure, of a dusky hue, but not fixed to the scalp. The right pupil was slightly smaller than the left and reacted normally to light. There was a marked right external strabismus and the eye could not be carried inwards past its middle line. A right ptosis existed and a dacryocystitis from blocking of the nasal duct. The teeth in the upper jaw were buried in a fleshy mass. Two days later the tumour in the right breast was considerably larger and there were three nodules on the scalp and he had developed a slight cough. Professor Stalker examined the lungs and reported flattening of the note over the left upper lobe behind, with weak breath sounds and medium resonant crepitations. Dr. MacGillivray examined the eyes and reported paralysis of the extrinsic muscles supplied by the oculomotor but not of intrinsic. The optic disc was normal. There was slight blurring above and below. Three days later the right pupil was dilated and did not react to light. The metastases continued to appear with remarkable rapidity. Within two days one had appeared above the external condyle of the right humerus, evidently in the subcutaneous tissue. On the following day the right testicle had become involved and eighteen new nodules appeared in various parts of the body. Four days later nine fresh nodules had appeared on the body and several on the scalp, and so it went on until the nodules become too many to enumerate. He had a diurnal variation of temperature of about two degrees during the first week, three degrees or less during the second week, and thereafter it continued high until it reached 103·6° four days before his death, which



FIG. 2.

Right intra-nasal carcinoma (male, æt. 29), showing facial deformity; secondary nodules under scalp, in left breast, on right arm, over left scapula, and right sterno-mastoid.



FIG. 3.

Metastases in right testis, and in lower limbs in Case 2.

occurred twenty-eight days after his admission to hospital. The condition shortly before death was a very striking one, both as regards his facial appearance (Fig. 2) and his many metastases (Fig. 3). The partial post-mortem examination was a somewhat unsatisfactory one. The entire right nostril was filled with a soft hæmorrhagic carcinomatous mass, which extended on to and involved the upper gum and spread backwards to the base of the skull in the pharynx. It was not noted that the septum was destroyed, nor was the antrum of Highmore obviously affected.

Here, obviously, the condition appeared in the roof of the nose. By the time it had progressed sufficiently to cause symptoms of hæmorrhage and nose obstruction the disease had far advanced towards a copious metastatic involvement.

The tumours in the two cases presented a certain similarity in their softness, their vascularity, and their rapidity of growth. As regards their origin there was but little difference; as regards their clinical course there was practically no similarity. In the first case the growth progressed rapidly to enormous destruction, with no glandular involvement and no secondary growths; in the second case, though the primary growth was certainly not slow, it was extraordinary how rapidly secondary involvement set in and how extensive and general it became. According to Pirie and Skirving's paper metastases are not common; perhaps when they occur they are unusually rapid and extraordinarily widespread.

A CASE OF INTRA-PERITONEAL HÆMORRHAGE FOLLOWING ENDOCARDITIS AND MESENTERIC EMBOLISM.

By J. W. STRUTHERS, F.R.C.S.,
Assistant Surgeon to the Royal Infirmary.

Miss A. R., aged 19 years, was admitted to the Royal Infirmary on Sunday, 30th October 1910, in a state of grave collapse. The history of her illness was briefly as follows:—For 6 months before her admission she had suffered from chlorosis, latterly attended by dyspepsia, and had been under treatment for this at the Cowgate Dispensary. Cardiac murmurs, presumed to be hæmic in origin, had been present, and menstruation had been absent for 6 months. The patient was, however, well enough to be up and about, and no acute symptoms appeared till Friday, 28th October, two days before her admission to the Infirmary. On Friday afternoon she was seized with moderately severe pain in the right iliac region. Shortly afterwards she was seen by Dr. Hitchcock, the resident medical officer of the Dispensary, who found that she had pain, tenderness and muscular resistance in the right iliac fossa, unattended by sickness and without any febrile

symptoms. He regarded the condition as a mild attack of appendicitis, and directed her to remain in bed. On the following day she was considerably better, and the improvement continued till late on Sunday evening, when she was suddenly seized with very severe pain in the right iliac region, and shortly afterwards collapsed. Dr. Hitchcock saw her again and had her removed without delay to the Infirmary.

When seen there shortly after admission she was found to be profoundly collapsed. Her skin and mucous membranes were blanched, her breathing was rapid and shallow, her radial pulse imperceptible, and she presented all the features of a case of internal hemorrhage. The abdomen was not distended, was perfectly lax and free from tenderness. There was some dulness below the umbilicus and in the flanks.

While preparations for operation were being made saline solution was infused into a vein, but no improvement followed. Operation was undertaken in the hope of relieving her condition, but with small prospect of success.

A little ether was given by the open method, and the abdomen opened in the middle line below the umbilicus. The peritoneal cavity was full of fluid and clotted blood. Examination of the Fallopian tubes showed that both were healthy, and after a rapid search a large hæmatoma was found in the mesentery of the small intestine, and blood was seen escaping freely from a tear in the peritoneum towards the root of the mesentery. On enlarging this tear the ruptured sac of a small aneurysm was exposed and torn away, disclosing free hæmorrhage from a branch of the superior mesenteric artery. This was arrested by ligature, though with difficulty, and the abdomen closed. The strain was too much for the patient, and she died shortly after the operation. At the post-mortem examination the patient was found to have had endocarditis, with old and recent vegetations on the mitral and aortic valves. Old infarcts were present in the spleen and kidneys. The bleeding was found to have come from a secondary branch of the superior mesenteric artery just beyond the division of a primary branch.

The sequence of events was apparently as follows:—An embolus from the heart lodged in the artery, softening of the arterial wall followed, and a small aneurysm formed at the spot. This gave way, and blood leaked at first between the layers of the mesentery, giving rise to the mesenteric hæmatoma found at the operation. The peritoneum of the mesentery eventually tore and allowed blood to escape into the peritoneal cavity.

The case is of interest both from the pathological and clinical points of view on account of its rarity. Curiously enough, a few weeks ago the writer met with a case presenting similar clinical features, in which a man aged fifty years suffered for a few days from pain in the epigastrium and down the left flank. The pain began suddenly



RADIOGRAM OF BOWEL IN HERNIAL SAC.

while he was rising from the stooping position, but not making any special effort. It was so severe as to make him stop work, but improved after some hours, and gradually moderated during the next two days. On the third day, without obvious cause, the pain suddenly became very severe again, and the patient collapsed. He was admitted to Leith Hospital, but his condition was so bad that no operation could be attempted, and he died a few hours later. At the post-mortem examination the peritoneal cavity was found full of blood, and a hæmatoma was found in the gastro-hepatic omentum, from which the blood had escaped into the peritoneal cavity. The hæmorrhage had come apparently from a small aneurysm, but not one caused by embolism, as there was no endocarditis in this case.

The resemblance between the two cases was rather striking. In both illness began with moderate pain of doubtful origin, unattended by febrile symptoms; in both this pain improved decidedly, leading to the supposition that the illness was passing off; and in both sudden exacerbation, followed by collapse, took place, and the patients died in a few hours of hæmorrhage into the peritoneal cavity.

THE DIAGNOSIS OF THE CONTENTS OF A HERNIAL SAC BY X-RAY EXAMINATION.

By GEO. A. PIRIE, M.D.,

Hon. Medical Electrician to the Dundee Royal Infirmary.

THE diagnosis of disease of the stomach or intestine is frequently made clearer by means of a bismuth meal and the X-rays. It was during the examination of such a case lately that the presence of an inguinal hernia was discovered and this skiagraph was taken. The case is as follows:—D. B., aged 68, was admitted to the Dundee Royal Infirmary complaining of pain in the region of the stomach of eight days' duration. He looked old and thin. A bismuth meal (two ounces of bismuth carbonate in a pint of boiled bread and milk) was given at 10 A.M. The stomach was seen to be fairly normal in shape, but the fundus was three inches below the umbilicus. Peristalsis was feeble. At 4 P.M. a second examination was made. The stomach still contained some bismuth, but much had passed on, and its shadow could be seen in the cæcum. The diagnosis was made of gastric atony with defective emptying due to some obstruction at the pylorus. (At the subsequent operation Mr. Price found malignant disease of the liver. The pylorus was not involved, but was probably pressed upon by the new growth.)

During the X-ray examination a peculiar shadow was noticed in the pelvis. It was darker than usual and extended into the scrotum;

thus the presence of a right inguinal hernia was discovered. Not only was the outline of the intestine clearly mapped out, but the muscular action could be studied on the fluorescent screen. It was not so vigorous nor so rapid as one sees in the small intestine within the abdomen. About once in two seconds a constriction formed, cutting the bismuth mass in two; this remained a second, then slowly vanished, while the bismuth formed one mass again. Presently at another point a new constriction could be seen forming and then disappearing. This slow chopping process could be observed for several minutes without any trace of a forward movement. In the skiagraph one of these constrictions is shown; the others are not so clear because the exposure of the plate took 20 seconds.

I am not aware that any X-ray photograph of a hernia containing bismuth has hitherto been published, but it would be an easy method of showing whether a hernial sac contained a loop of intestine or not, and it might be of much service to the surgeon. The degree of muscular activity could also be easily determined, as the slightest constriction can be observed on the fluorescent screen. From a physiological point of view the study of such an isolated loop of intestine is very instructive.

MEETINGS OF SOCIETIES.

Edinburgh Medico-Chirurgical Society.

DISCUSSION ON VACCINE THERAPY.

THE Society met on 17th January 1912, the President, Mr. J. M. Cotterill, in the chair. The discussion on vaccine therapy introduced by Dr. James Ritchie at last meeting of the Society was continued.

Dr. G. Lovell Gulland said he should like, in the first place, to congratulate Dr. Ritchie on the very able exposition of the subject which he gave, and which has since appeared in the *Edinburgh Medical Journal*. He had said a great deal of what one would have said as regards the necessity for caution; he laid great stress on the importance of the estimation of results; and, further, pointed out that a small series of results was of comparatively little value. He (Dr. Gulland) fancied the only way at which anything like an opinion could be got was by all the individual small results being put together and analysed.

As regards *tuberculin*, he (Dr. Gulland) had only had to deal with glands, lungs, and certain kidney and other cases. In *gland tubercle* his impression was that the injection of tuberculin gives very satisfactory results indeed if certain elementary precautions are observed. The glands injected should not be amenable to operation; there was no use treating large masses of glands which must be removed. Where there was breaking-down or evidence of acute mischief the condition should be treated in other ways or by the

surgeon ; in such cases the patient would certainly not do well. In large glands, especially about the neck, where there is not a great deal of peradenitis, he had found tuberculin extremely useful ; great improvement in weight and in the whole condition of the patient had occurred, and the glands had dried up completely. In the early part of the treatment the important point is to begin with a small dose ; he never went sufficiently far to get the slightest reaction, and he went on as long as possible. Dr. Ritchie emphasised the point of the tuberculin reaching the focus which was affected. He (Dr. Gulland) was convinced that tuberculin acts also in other ways. With regard to bone tubercle, he frequently had to deal with spinal cases.

In *pulmonary cases* there was little agreement as to what is the right thing to do. His practice was not to use tuberculin for cases which are obviously doing well—cases in hospital putting on weight, the lung lesion drying up, temperature normal, pulse slow, etc. Further, it was certainly unwise to use tuberculin in cases of acute tubercle. The cases in which it is most useful are “stuck” cases—cases in which there is a certain amount of improvement with open-air treatment and then nothing further ; also in the very chronic cases, which are chiefly fibroid, most surprising results are obtained. Sometimes successes were seen in bad cases too. He referred to one of his earliest cases, at the time of the revival of this question, where the patient was going steadily downhill. With great difficulty the friends were persuaded to allow tuberculin injections. There was a great deal of moisture, the heart and digestion were bad, but from the time of injection the patient began to improve, got well, and has kept well.

In *kidney and bladder cases* his experience was that tuberculin was useful.

The question of the particular tuberculin used was important. Personally he had steadily used T.R., partly because he began by using it, and partly because he had succeeded in getting good results from it. He was not prepared to say that it was ideal or that it gave better results than other forms. He did not think it mattered which form was used—the important thing was that one should use one preparation and stick to it until one knows it thoroughly. He had seen men jumping about from one form to another, and he was perfectly certain that they did not get the same confidence in dealing with it. He began with a very small dose, but of course the dosage must be varied with the kind of case and the acuteness of it. He endeavoured never to produce a temperature reaction, and very rarely indeed gave above $\frac{1}{2000}$ mgrm. of T.R. In children, particularly young children, it was necessary to be exceedingly wary ; in children it seemed to be a much more active drug than in adults, and the dosage had to be regulated by the age of the patient.

A great deal had been written of late on the question of giving tuberculin by the mouth, and the utility of using it in that way. It was, of course, not ideal in cases where it can be given by the needle, but it was useful in the case of nervous children and also adults who would not submit to the needle. Provided it is given on an empty stomach in the morning, as far away from food as possible, he was quite convinced he had got good results from it.

It so happened that he saw a good many cases of *puerperal septicæmia*, partly because they happened to be anæmic cases as well, and in these cases his experience of vaccines had been most disappointing ; better results were obtained by antistreptococcus serum. In some of the cases where vaccines were used they produced definite harm. In acute cases it is rarely possible

to use vaccines. In other septiciæmias his experience had been that the vaccine treatment was not very satisfactory. The difficulty was that these cases were very seldom got in an early stage; they are sent to hospital after having been ill for ten days or longer, and even in consultation they are only seen after a time, consequently a new growth was very seldom got from the blood at all. If one does succeed, the changes in the patient have often gone too far to allow one to do much good. If one succeeds in getting a blood culture during the first three days, in all probability much better results are obtained. One hopes that the profession will be wakened up to the importance of dealing with septiciæmias as early as possible.

In *gonorrhœal infections* he had seen very grave results indeed. He had seen cases of chronic gonorrhœa, going on for long periods, in which vaccine had been tried with the most disappointing results; the stimulation seemed just to waken up the gonorrhœal condition, but his experience of gonorrhœa in that way was, of course, limited. In gonorrhœal joint affections he found vaccine treatment very useful, provided one is careful to begin with a small enough dose and go on long enough.

In *coli infections of the urinary tract*, as they occur in adults, and especially in women, one must differentiate several forms in their relation to vaccine treatment. In acute cases it is never necessary or wise to attempt it. They almost all get better with ordinary treatment, and generally no bacteriuria is left. In chronic cases there are three main varieties—(1) Pure bacteriuria without symptoms. In these vaccine treatment is usually disappointing, probably because the organisms are on a surface where the antibodies cannot reach them. (2) Bacteriuria associated with ulcer in the bladder or urethra, or with inflammatory conditions in the pelvis. In these cases the ulcer or pelvic condition must first be treated. Thereafter he had obtained good results with vaccines, but it was of course quite possible that these were more apparent than real. Possibly other treatment might have done just as well. (3) Cases where there was constant or more often repeated infection of the urinary tract through the kidney from the bowel. In these cases vaccines are of no use. The bowel must be treated. He had found it very easy to produce febrile reaction with even small doses of coli, and recommended great caution.

He had been much encouraged by the results of vaccine treatment in some *respiratory conditions*. Nasal catarrhs sometimes do well, sometimes badly, and it seems to make little difference whether one uses stock or autogenous vaccines in this respect. Probably the cases which did badly had definite structural changes present which kept up the catarrh. The same statement applied to asthma. Much better results can be got in chronic bronchitis, bronchiectasis, and chronic non-tubercular abscess of the lung. Acute abscesses either die or get better, as a rule, and only need vaccine treatment if they are drifting into chronicity. His results had been best when the pneumococcus was the organism concerned. With mixed vaccines there was the usual difficulty of dosage and of estimation of relative virulence. The results were better in the slighter and more recent cases and in young people. Too much must not be expected where there are definite and widespread structural changes in the lungs and secondary cardiac derangement, but even in these fair results can sometimes be obtained.

Dr. T. Shennan joined with Dr. Gulland in congratulating Dr. Ritchie upon the very clear exposition of the subject which he had given. He did

not wish to criticise, but to ask one or two questions. It might be useful if Dr. Ritchie were to amplify his description of the focal character of lesions. He made a great deal of that, and rightly, but he (Dr. Shennan) should like him to give his experience or advice in such cases as streptococcal conditions in which there are multiple foci, *e.g.* endocarditis with multiple secondary abscesses. He himself had always felt inclined to discourage the giving of vaccines in such cases. He had seen as a result the temperature go down and remain low, but it was just a question whether this might not be evidence of severe toxæmia rather than of improvement.

Dr. Ritchie had referred also very rightly to the mode of action of vaccines, but he (Dr. Shennan) should have liked if he had said more about their toxicity, because they were not dealing with a simple therapeutic agent, but with a therapeutic agent of the nature of a very active bacterial protein; it was not a case of homœopathic treatment, but of treatment by extremely small doses of a very toxic agent which produces a reaction in the tissues. The importance of this had been borne in upon him recently by a friend in doing a vaccination. He (Dr. Shennan) asked him what dose he was giving, and he replied, "The contents of the bottle," meaning the ampoule containing the vaccine, but he was unable to say what the dose was. One must be very careful to know the actual dose of the vaccine. There was no doubt that different vaccines varied in their toxicity. He had seen harm done by overdoses of *bacillus coli*. Streptococcal and pneumococcal vaccines also must be given in extremely small doses.

In connection with lupus he had not had much experience in giving vaccines in tuberculous conditions, but in one case of lupus he found no benefit at all by any dosage of T.R. He should like to know the experience of others in treating lupus cases with mixed vaccines. His colleagues and he turned out a large number of vaccines in the course of a year, and they had met a great number of cases in which the *bacillus proteus* had been present, *e.g.* from cellulitis, sinuses, fæces, appendicitis, middle-ear disease, lateral sinus, suppuration, lumbar puncture fluid, empyema. The question was, Is it a pathogenic organism or has it anything to do with the effect of the other organisms present in assisting their action? He was rather against mixed vaccines as a whole, but when giving them they had been going on the principle of separating the different organisms present and standardising each.

One or two points with regard to results. With the *micrococcus catarrhalis* he had found most encouraging results in ordinary common colds, particularly when it is associated with the *pneumococcus*. A vaccine often clears away the active condition and actually protects the individual from other attacks. He had not much experience of treatment with the *gonococcus*, but with the *staphylococcus* he had, of course, a fair amount of experience. 43 per cent. of the vaccines they sent out from the Pathological Department of the Infirmary were for staphylococcal cases. That would give some sort of idea of the ratio of such cases. In one staphylococcal case, where the patient, a male, aged 65, had had 200 boils and 8 carbuncles, injections were given: after several months' treatment they cleared away completely, and there had been no return for several years. On one occasion the dose was given too soon; a very severe attack of boils resulted, followed by the eighth carbuncle, which was the worst of all, but it was the last. This would emphasise the importance of watching the doses and the intervals between the doses.

The last point was by way of suggestion. He had sometimes met with very curious toxic conditions in which it was very difficult to say what was the actual cause. He mentioned one case, which had been not at all amenable to ordinary treatment, in which the patient nine years previously had had a very bad attack of boils which had brought down the general health very considerably—in fact the patient had never completely recovered. The pus from the boils was examined, and the *staphylococcus aureus* found almost pure. The patient was very subject to colds and slight inflammatory conditions, and on such occasions almost invariably the *staphylococcus aureus* was found. After one or two experiences of separating this organism from different lesions he began to wonder whether the chronic toxic condition might not be due to a chronic “latent” infection by the same organism. That idea was supported by the fact that the opsonic index was 0.65 to the autogenous staphylococcus, and after one inoculation it rose to 0.85, and was still rising. Such cases, of course, had to be very carefully scrutinised and watched before vaccines are tried. He suggested that it would be well to keep one’s eyes open for these cases.

Dr. Struthers Stewart said that one or two points had occurred to him dealing entirely with the clinical aspect. Staphylococcal infections were very common; everybody saw a considerable number of such cases. He drew attention to the point that the vaccine treatment of acne should be continued until all the redness and inflammation round the foci disappeared. He had seen several cases where it had not been carried out long enough and the condition had relapsed. Streptococcal cases, in his experience, yielded better results than any others. He had seen almost immediate relief of pain follow inoculation. In one case in which a sinus followed tuberculous disease of the spine, which had been operated on, and where it had persisted for about a year, the condition was found to be streptococcal. After eight inoculations of vaccine the sinus healed up entirely; no other treatment was applied. Bronchitis seemed to be fairly often due to the streptococcus, and here, again, the results were satisfactory. After an inoculation the sputum increases in amount, and on physical examination the physical signs are somewhat increased. This condition continues for perhaps three or five days, and is then followed by gradual diminution in the amount of sputum. In such cases the amount of sputum is to be used as an indicator for reinoculation—a secondary increase after a week indicates reinoculation. In acute and severe tonsillitis, too, he had found the streptococcal vaccine useful. In one case where the temperature was 104° F. he gave a dose of 5 millions of the streptococcal vaccine. In the evening the patient was very comfortable—temperature 101° F.; in 24 hours it was normal and did not again rise. The patient was practically well the next day.

He could not agree with Dr. Shennan about the pneumococcus; he had been less successful with it. In pneumonia he found it difficult to form a definite opinion. If the vaccine is given before the 3rd day the crisis appears before or about the 5th day; if more than three days have elapsed before inoculation he was not satisfied that the vaccine was of any benefit. The doses of vaccine mentioned by Dr. Ritchie—20 to 30 millions—seemed to him too large; he (Dr. Stewart) had never used an initial dose above 10 millions. With tonsillitis, when due to the pneumococcus, he had not been successful at all. In one case of acute suppuration of the mastoid he had got no result. In cystitis due to the bacillus coli results have been

satisfactory, the first sign of improvement being diminution of the bladder irritability. In such cases it was almost essential to use an autogenous vaccine ; the stock vaccines seemed to fail.

A great deal had been written about rheumatoid arthritis of late, and in some cases the results were satisfactory. He (Dr. Stewart) had examined 22 cases of this kind recently, and in none had he found the diplococcus described by Bannatyne and Lindsay. He mentioned the case of a young girl with repeated bilious attacks accompanied by pains in the joints. The patient had been abroad, and tried various diets without any result. Examination of the urine during one attack showed a high specific gravity, the presence of urates, bile pigment, and indican. Immediately after an acute attack of biliousness the joints were distinctly better, and remained so from a fortnight to six weeks. The blood on opsonic examination was 0·3. She was given 10 millions of stock vaccine. This was followed by a typical bilious attack ; after the attack had passed off she again felt better. She was told to come back and see Dr. Stewart as soon as the headache and nausea began. She returned in 9 days, and was given another injection. This time the reaction was not nearly so severe, and the patient remained free from pains in the joints and headache for 20 days. The inoculations were continued, and after the 6th, movement in the painful joints began ; now, after the 9th inoculation, she can use the hand so well that she can ride and manage a spirited horse. After the first 3 inoculations a saline purge was given to lessen the effect of the reaction.

As regards dosage the amounts given in books were too large. The doses he used were—staphylococcus, 50 to 1000 millions ; streptococcus, 1 to 50 millions ; bacillus coli, 2·50 to 100 millions ; pneumococcus, 5 to 50 millions.

Where pus is enclosed which cannot be removed by operation he had never seen any result from vaccine.

Dr. Stewart had found that if the dose of vaccine were efficient the inoculation was followed by a leucocytosis. If there were no leucocytosis either the dose was too small or the patient was incapable of reacting to the vaccine. If the latter the prognosis was grave.

Mr. Peel Ritchie thought the present state of inoculation treatment very interesting. He feared there might be a reaction in its use on account of the bad results from its indiscreet use or the unsatisfactory results from its incorrect use. It was most important to recognise its limitations and to understand exactly what is to be expected from it in order to avoid disappointment. With this proviso one might well look upon inoculation as a routine treatment in all infective conditions where the causal agent is known. There was a special satisfaction, in that the treatment is a specific one. On the other hand it was a great mistake to look upon it as a thing apart, contra-indicating other treatment, local, general, or operative, or to turn to it as a last resort. It was in no way antagonistic to other forms of treatment, and as for operative work, inoculation, when fully developed, would probably prove the greatest advance since the introduction of antiseptic methods, of which it was really a further development, in insuring safety and certainty of results and of extending operative possibilities. He was specially referring to its use prophylactically. It was probably a mistake, therefore, to judge of its value by pitting statistics of the results of inoculation treatment alone against those of other forms of treatment alone. The best results would be obtained by using inoculation along with such other methods of treatment as might be required.

But there were many difficulties to contend with, and, first, with regard to the chaos of dosage. Every writer put forward his own scheme of dosage when based on an enumeration method. The enumeration of organisms was unsatisfactory, because one was estimating in numbers cocci or bacilli which vary enormously in diameter or length in different cultures. It was impossible to arrive at a satisfactory dosage in that way. A uniform standard was necessary, and that could be obtained, as was done with tuberculin, by weighing the solid mass of dried bacteria.

Then there was the uncertainty as to etiology. Bacteriology had advanced far, but not far enough, from the point of view of the inoculator, in giving information as to the exact causal agents. Take, for instance, appendicitis or affections of the mouth or nose. On any mucous tract there might be a great many organisms present, but it was very difficult, or impossible, to say what the actual causal infective agent might be when an infection had developed. Then there were also the many internal conditions where one could only surmise as to the bacterial causation. There was a great field for work in these directions. There was still a lack of knowledge, too, as to certain constitutional conditions which seem to cause delay in immunisation, as one may see in gouty cases for instance, and as to such obscure influences on the state of immunity as change of environment may produce, as shown by the tendency of people going on a holiday or coming back from one to develop boils, colds in the head, or other infective conditions. The recent work also on supersensibility or anaphylaxis opened up very large questions which might greatly alter the present views with regard to inoculation treatment.

Then there was the lack of satisfactory results where an infection was confined to a mucous membrane or some superficial area of skin, as one finds in catarrhal affections or in lupus. In this connection he would specially refer to gonorrhœa. As an acute infection of the urethra there was, unfortunately, but little benefit from inoculation, while gonorrhœal infections of the joints or other internal parts are benefited. This is probably not a special feature of the gonococcus, but due to the difference of results in treating a superficial or on the other hand an internal infection.

Individual cases, again, present difficulties on account of some special local feature of anatomical or mechanical nature, and in that respect he would mention foreign bodies in the widest sense, such as necrosed bone, calculi, effusions in joints, caseous material in tuberculous affections, buried ligatures of silk, etc. These all constituted foreign bodies which, so long as present, prevented healing, and it was not to be expected that inoculation itself would bring about their disappearance. Abscess cavities not amenable to drainage, or with excessive induration of their walls, hindering the surfaces coming together, might be absolutely prevented from healing, even though one might at the same time by inoculation get rid of a number of the organisms and diminish the discharge.

With regard to a point in Dr. Ritchie's paper he must disagree with his statement that in the formation of antibodies "very little change can be observed in the body for from 36 to 48 hours." In a paper which he (Mr. Peel Ritchie) had read before the Society some time ago he drew attention to the early effects of inoculation as shown by a rise in the phagocytic index of perhaps more than fifty per cent. within 1 to 6 hours, even when followed by a later negative phase, and other observers had recorded the same. It was on the basis of this observation that he had felt

justified in putting forward the desirability of prophylactic inoculation at the time of an operation or an accident.

Dr. Cranston Low referred to his experience with vaccines in skin diseases, and mentioned three conditions, namely—(1) staphylococcal infections, (2) acne, and (3) tuberculosis. In the Skin Department of the Royal Infirmary they used primarily stock vaccines, and only in exceptional cases autogenous vaccines. They did not count the opsonic index, but judged merely from the local appearances. Everybody knew that the results in furunculosis were good. If patients with several boils were given a vaccine they nearly always were made worse, for the reason that they were being overdosed; they were already absorbing a great deal of vaccine from their own lesions. A much more reasonable plan was to open the boils and apply Klapp's cup, and, when the acute lesions had gone, use the ordinary vaccine.

With regard to dosage they used to use about 1000 millions staphylococci. This was now reduced to about 25 millions, and would go still lower. Quite good results were got by small doses, and there was much less risk of doing harm.

Cases of sycosis go on as a rule for a very long time. In the last two or three years they had treated 53 cases of sycosis, and out of that number there were a certain number of cures. A great many injections were necessary—at least 20—spread over a number of months. If the patients would continue the treatment for a sufficient time good results certainly were obtained. In one case of 9 years' duration 5 injections effected a cure; that, however, was exceptional, the average case requiring at least two dozen injections. An important point in such cases was the necessity for local treatment as well, such as X-rays.

He looked upon acne cases as quite separate from staphylococcal infections; clinically and microscopically the conditions are different. A certain amount of suppuration is seen in these cases. The use of staphylococcal vaccine produces no benefit except for secondary infections, *e.g.* boils. They had used in some of these cases the acne bacillus vaccine with the staphylococcal vaccine, and had obtained a result up to a certain point. The vaccine had no effect on the comedones. The explanation of the non-result was that there is practically no circulation round about the comedones, and therefore the antibodies produced by the vaccine never came into contact with the organisms in the comedones.

Within the last three years they had treated 77 cases of tuberculosis of the skin with tuberculin, and the majority of these were lupus. He had not seen a single cure in lupus. They had used almost entirely T.R. in doses of $\frac{1}{1000}$ mgm. The patients got this once a fortnight, and the only result was a diminution in the infiltration. The only advantage it has is that it allows one to see more definitely the extent of the disease and see the isolated nodules and apply local treatment accordingly. They had also used the bacillary emulsion, but with no better result.

In conclusion he emphasised (1) the importance of not relying on vaccine treatment alone; (2) the importance of prolonged treatment. His experience was that most patients expected to get cured of the condition after one or two injections. If one was not going to carry out the full course of treatment it was not worth while starting. Many hospital patients disappear after one or two injections, not, he supposed, because they were cured, but

because they were disappointed that they had not improved more quickly ; (3) the dose should be small in the first instance ; there was no necessity for any fixed dose—personally he gave a minimum dose and gradually increased it—find out what dose the individual patient can stand, always bearing in mind that you should not produce any local or general reaction.

Dr. Carnegie Dickson also joined with the previous speakers in congratulating Dr. Ritchie, and only wished that Dr. Ritchie, though rightly keeping to general considerations in opening the discussion, had put a little more of himself into it and given his experience as regards his own cases ; he was sure he had a large number of very valuable facts available.

Dr. Peel Ritchie had referred more especially to dosage. It was, however, not merely a question of size and number of organisms, but, what was still more important, virulence. Even the same organism in and from different cases will give enormously different results. In ordinary staphylococcal treatment one strain will do extremely well and another very badly ; one has to choose one's strain. There was no use labelling the tube, say, *Staphylococcus aureus* ; one must know one's strain of *Staphylococcus aureus*. The question of virulence is of as much importance as the question of actual numbers.

Most of the speakers, especially Dr. Low, had emphasised the importance of giving a small dose and watching the case, a position with which he (Dr. Carnegie Dickson) was in full agreement. He would also strongly appeal for more information from the clinicians who used the vaccines as regards results—Dr. Shennan and others who prepared hospital vaccines would back him up in this. Dr. Eyre of Guy's Hospital has certain cards printed, and sends them to the wards in which the different patients are being treated, and it is the duty of the physician or surgeon in charge to fill them up and return them to the bacteriologist, who has them tabulated and gets important results in that way. Notwithstanding the large numbers of vaccines they made, they were largely ignorant of the after-results ; this was a loss not only to the patients but to science.

Most of his experience had been with very young children, and seemed to be practically identical with that of the previous speakers. Cases of boils often disappear like "snow off a dyke." In cases of mixed infections it was important to isolate the different organisms present. He sometimes used them *separatim*, sometimes mixed them after separating and standardising them. He had had a considerable number of staphylococcal cases in children, both superficial infections, such as boils and ulcers, and internal infections, such as osteomyelitis cases after operation ; these cases usually did well if the conditions were also treated surgically. His other most numerous set of cases were coli infections. In the medical profession at present there was a great difference of opinion as to whether coli infections do well or not with vaccine treatment. His own experience did not help to solve the matter—some did extremely well, some extremely badly. Of course with such cases one never dreams of using a stock vaccine, it must be autogenous. Coli infections, of course, often do extremely well without vaccine, and it is usually only in serious cases, where improvement with other means cannot be got, that one is asked to prepare vaccines.

He would impress upon clinicians outside hospitals that they must get these vaccines from a reliable source. Thus, to mention only one point, they must be certain that they are properly sterilised. He had known two

instances where vaccines were proved to be non-sterile and where a generalised infection followed.

Dr. Dingwall Fordyce said Dr. Ritchie's paper was especially interesting, not so much in the details of treatment as in the attitude of mind of such a trusted scientist. Two points had struck him—the first was the extent to which he dwelt on the darkness of science as regards the nature of infection, of intoxication, and of tissue reaction; and, secondly, towards the end of his paper, on the opportunity which this means of treatment gives to the charlatan for practice. It seemed to him (Dr. Fordyce) that it was necessary and possible to steer between two extremes, and that it was well to realise that, while there is a Scylla of "crass empiricism" on the one side, there is also a Charybdis of *inexact* science on the other. It is only by careful examination of clinical facts that one can get further. The opinions of two very distinguished men whom he had met during the summer—an American and a German—two men who had large experience in this subject in their respective countries, were striking. Professor Howland of New York said his opinion was that staphylococcal vaccines were extremely good in furunculosis, but when one had said that one had said all that was known. Professor Czerny said, as the result of his experience, he had come to the conclusion that tuberculin was capable of great harm, but it was impossible to say of what value it was as a therapeutic agent.

He (Dr. Fordyce) disagreed with both Dr. Cranston Low and Dr. Carnegie Dickson. The former said in a patient with several boils the vaccine often made the condition worse; the latter said that boils always do well with vaccines. In babies he found that when the furunculosis was primary, staphylococcal vaccine always did good; when secondary to wasting disease such as tuberculosis it did not do good. In multiple boils, where the condition was primary, a vaccine did good; *e.g.* in a recent case there were 37 boils opened by the surgeon and at the same time staphylococcal vaccine was given; no further boils developed, and the child is now free from boils. He had never seen a case of primary furunculosis in the young child where the vaccine did not do good.

Where an empyema was opened and drained, where the discharge was prolonged, and where staphylococci were the secondary infecting agents, a staphylococcus vaccine did good. He agreed entirely with Dr. Gulland as to tuberculin. He used it only in afebrile cases of glandular infection. He employed small doses, and he sought to avoid even the slightest reaction. The number of cases in which it is applicable is thus greatly restricted, but such restriction renders it a safe therapeutic agent, and usually its administration gives good results.

Mr. Wilkie spoke of vaccine therapy as a prophylactic measure against infection at the time of operation. In this connection vaccines might be employed before operations on parts where certain types of infection are liable to occur. In abdominal cases, where post-operative peritonitis was to be feared, a preliminary injection of vaccines might be used with benefit, though in clinical cases it was very difficult to estimate the extent of that benefit. The type of case he referred to was where an abdominal operation had to be done in two stages, either on account of the bowel being obstructed acutely, necessitating enterostomy, or on account of the operation being particularly serious and it being thought advisable to make it in two stages. If an enterostomy were performed as the first operation, vaccines could be made from

cultures from the faecal matter, and if such were injected, between the primary and secondary operations, he believed a certain amount of resistance to infection at the time of the second operation was obtained. From experimental observations he had found that animals would stand about three times the lethal dose of an organism injected into the peritoneal cavity if they had previously received a dose of a corresponding vaccine supplemented by a dose of nucleic acid. He entirely agreed with Dr. Ritchie that vaccination, either as a prophylactic or as a curative measure in acute infections, did not hold out anything like the same prospect of success, as did the administration of antitoxin in diphtheria or tetanus. In a case of acute abdominal infection where the patient had been operated on and was in a critical condition, it was obvious that he was suffering from a profound toxæmia. The protective forces of such a patient did not require stimulation, they required help. Serum therapy was therefore the more rational treatment for such cases. In cases of chronic suppuration in the abdominal cavity there was usually some mechanical factor interfering with drainage, and no matter how much vaccine might be injected, there would be no real improvement without surgical interference.

With regard to the treatment of mixed infection in tuberculosis, particularly in children, he had obtained good results by using a vaccine of the organism which was the cause of the mixed infection. All the speakers, he was interested to hear, had mentioned that the dosage of vaccines was becoming progressively less. Dr. Gulland thought that in children the dose must be extremely small. That was contrary to what he had found in using mixed vaccines, because in no case did he see any reaction whatsoever, although he had given as large a dose as 300 millions bacillus coli and a like dose of streptococcus to young children. Possibly in these cases the organisms were of low virulence.

Mr. W. J. Stuart said that for the last 18 months, since Dr. Struthers Stewart had been on the staff of the Deaconess Hospital, every surgical patient suffering from a bacterial disease had been treated by means of vaccines. A very considerable number of patients—both in-patients and out-patients—had therefore received a course of inoculations by an expert, at such intervals and in such doses as he considered suitable, while both surgeon and vaccine therapist saw them frequently. While a larger number of cases would be required in order to form an opinion regarding the progress of cases of unmixed tubercle under vaccine treatment, he had come to the very definite conclusion that cases of tubercle complicated by pyogenic infection yielded to vaccine therapy in a manner which in many cases exceeded his utmost expectations.

Dr. James Ritchie, replying, thanked the members who had spoken and the Society generally for the way in which they had received the paper which he had read. From the discussion he felt he was justified in the positions he took up, which were chiefly—(1) That a case had been made out for the application of vaccine therapy; (2) that the results of vaccine therapy were best estimated by clinical observations; and (3) that vaccine therapy ought never to be applied to diseases the etiology of which was uncertain.

There had been very little said which called for any elaborate reply. He had felt that his part was to open the discussion and to look at the subject perhaps more from the scientific point of view, with a view to eliciting the

practical experience of the clinicians, and he thought they had had a very fair representation of that opinion.

To Dr. Carnegie Dickson he was much obliged for the suggestion that he should have put more of his own experiences into this paper, but he (Dr. Ritchie) suffered in rather a more acute form from what other speakers had complained of, namely, that of all the scores of vaccines which one made one very seldom heard anything definite of the results obtained with them. The only reason one had for suspecting that no harm had been done was that people continued to ask for vaccines. Therefore he had had to confine himself chiefly to the scientific aspect, and to cite a few cases where, from knowledge of the literature, one felt that a definite statement could be made.

Some remarks by Dr. Gulland and also by Dr. Cranston Low seemed to indicate that a slight misapprehension had been raised by a statement regarding the way in which vaccines probably act. He had not intended to hint that for the production of the antistances in the vaccinated person the vaccine had to reach the focus of infection. What he said was that there exists in the body a general reactive mechanism which may be stimulated by a vaccine, and that the evidence they had of the existence of such a mechanism rests in the changes which occur in the serum as a consequence of immunisation. It was these products which must reach the focus of infection, not the vaccine itself. One or two speakers referred to the toxic nature of the infection. Dr. Shennan raised a very interesting point, namely, the relative degree of confinement of the organisms to particular parts of the body which may occur in different diseases. He agreed with Dr. Shennan that where there were a great many foci of infection it was probable that the application of a vaccine would be less efficacious than where there was only a single focus. It was, he thought, impossible to make a statement as regards the extremely difficult case of ulcerative endocarditis. In this disease, although there must be constantly a large number of organisms being washed off the heart valve, yet even where there were a number of abscesses in different parts of the body these could not in any way represent the total number of organisms which were washed off. He strongly suspected that the greater number of the organisms which pass into the circulation are actually destroyed in the blood, and that after all the condition is to be looked upon as really one of a single focus of infection. It might be that the resources of the body are taxed to the utmost to kill the organisms which are being washed off, and that there is no possibility for a further stimulation by a vaccine.

Then as to a point referred to by Dr. Gulland and other speakers, namely, that in certain cases antisera are preferable to vaccines, he was pleased to hear that statement made, because of recent years there has been too great a tendency to reject the antisera in the treatment of infectious diseases. He quite admitted their power was limited, but since the time when Wright attacked anti-infective sera generally, and said that the only efficacy they could have was in the way of acting as vaccines, he thought there had been a great tendency to go to the other extreme, and to think of these sera as of no use whatever.

The point raised as regards standardisation by Dr. Peel Ritchie and Dr. Carnegie Dickson was a very important one, and one he had not gone very fully into in his paper, chiefly from considerations of time. He did not know that there was any aspect of the subject so unsatisfactory as the question of standardisation and dosage. He quite agreed with Dr. Carnegie Dickson's

criticisms of the method of estimation by weighing. Neither in weighing nor counting was allowance made for the all-important factor, namely, the virulence of the strain of the organism which was being used. Thus none of the present techniques of standardisation vaccines could give an absolute measure of the potency of a vaccine. The only practical method was to start with an extremely small dose and work up.

In conclusion he thought the main point was to bear in mind what he tried to insist upon, that at the present time every vaccination is in the nature of an experiment, and it is an experiment which they must try and control in as scientific a fashion as any laboratory experiment in which patients were not involved. When one found cases of disease which might or might not be bacterial, treated by organisms which might or might not have been present in the patient, and when practitioners in treating mixed infections used mixtures of bacteria, not knowing to what organism the condition was due, one could only agree with the remarks which some of the speakers had made in the course of the discussion—that there is the greatest danger of this treatment being entirely discredited and coming to an end because its limitations have not been recognised.

Dr. Alexander James read a paper on “Trauma as a Factor in Disease,” which will appear in the *Journal*.

A CLINICAL meeting was held in the Royal Infirmary on 20th December 1911, Mr. J. M. Cotterill, President, in the chair.

Dr. Dawson Turner showed—(1) A man, aged 50, who had been treated with radium for leucoplakia. The disease had disappeared from the parts treated. (2) A child after successful treatment of a congenital naevus with radium.

Dr. John Eason showed a case of gout, which has been reported in the *Journal*.

Mr. Wilkie showed two cases of syphilis treated with salvarsan. The first was an old woman who had suffered from syphilitic symptoms for 25 years in spite of treatment. For 15 years she had attended as an outpatient for psoriasis and leucoplakia, with fissures in the tongue. The psoriasis disappeared in 15 days after the salvarsan, and the tongue symptoms had greatly improved. The second case was a woman who had suffered from a specific ulcer of the leg for six years in spite of treatment. She had given birth to four still-born children. After salvarsan the ulcer healed in four weeks and the next child was alive and healthy.

Dr. Chalmers Watson showed a case of rheumatoid arthritis. Apparently complete recovery had followed a restriction of animal protein diet and the use of salines.

Professor Caird showed—(1) A case of tropical abscess treated by incision and drainage. A very profuse discharge continued till large doses of ipecacuanha were given and then discharge ceased in five days. (2) A case of extroversion of the bladder in a woman aged 32. There had been little discomfort till the bladder was affected with carcinoma. Removal of the neoplasm entailed division and removal of part of the right ureter. Subsequently ascending pyelitis of the right kidney occurred.

Dr. Edwin Bramwell, for Dr. Byrom Bramwell, showed a case of hysterical contracture of the hip. The patient had been treated for hip-joint disease in

a hospital for five weeks. Rapid recovery followed treatment by isolation and suggestion.

Mr. Cathcart showed cases illustrating satisfactory results as regards function after fracture, although the restoration of the contour of the bones was not perfect. The cases included one of impaction of the neck of the femur—a case with very considerable shortening of the femur after two fractures of the shaft; and a man with $2\frac{1}{2}$ ins. of shortening and overlapping following a fracture of the leg.

Mr. George Chiene showed a girl after treatment of a very oblique fracture of the femur by wiring.

Mr. Wade showed—(1) A woman after nephrectomy for acute consecutive suppurative nephritis. The symptoms were of such urgency that no attempt was made to investigate kidney function. Operation by the transperitoneal route gave a satisfactory view of the kidneys and of other organs which might possibly have caused the symptoms. (2) A case of cellulitis of the leg due to an anthracoid organism. Recovery followed the use of Sclavo's serum.

Mr. Lochhead for Mr. Miles showed—(1) A patient after a plastic operation to cover the stump left after amputation of crushed fingers. The granulating surface was covered by a flap taken from the anterior abdominal wall. (2) A patient illustrating a stage in the restoration of the nose and upper lip after syphilitic ulceration. To support the flap to be taken from the forehead a bony septum was formed by implanting a slice of bone obtained from the astragalus of another patient on whom arthrodesis of the ankle was performed.

Dr. J. V. Paterson showed a case of traumatic exophthalmus, due to arterio-venous aneurysm in the orbital cavity. There was complete blindness of the affected eye, and the characteristic bruit was loudly audible.

Forfarshire Medical Association.

At the December meeting of this Association Dr. R. C. Buist occupied the chair.

Mr. D. M. Greig showed a cast and photographs of a child with multiple deformities. There was double genu recurvatum with absence of patellæ, while the femoral condyles projected into the popliteal spaces. In addition there was congenital dislocation of the hips. A young man was also shown who had left genu recurvatum with a patella present, club-hand and club-foot, for the last astragalectomy having been performed. Mr. Greig also exhibited a cast of the foot and leg from a child with Volkmann's contracture, and thereafter read notes of a case of syphilitic cirrhosis of the liver. A man of 50 years had come under treatment four years ago with symptoms pointing to malignant disease of the liver. An exploratory cœliotomy was performed and gummatous masses were observed in the liver. For three years he continued to show improvement, but a year ago he began to lose weight, ascites appeared, and repeated tapplings were performed. A post-mortem examination showed typical syphilitic cirrhosis of the liver with an enlarged spleen.

Dr. Pirie read a paper on the "Use of Carbon Dioxide Snow in Treating Skin Affections." He gave a short account of the history of its employment and demonstrated the method of application.

Dr. Foggie gave an account of the case of a woman, aged 65, in whom

a tumour of the epigastrium had been recognised. She complained of very severe pains in the back which radiated towards the shoulder. The condition found post-mortem was scirrhus tumour of the pancreas with a very large necrosis in the tumour mass. The disease had extended to the bowel and throughout the peritoneal cavity. Pain such as she had suffered was present in many such cases.

Dr. Leitch showed specimens of cirrhosis of the liver from the dog and the rabbit.

Professor Kynoch showed a series of specimens—(1) Cancerous degeneration of an ovarian cyst. A patient of 65 was operated on for torsion of the pedicle of a cystic right ovary. The left was also cystic. After removal the right ovary was discovered to be in an early stage of malignant growth. (2) Pyometra removed by vaginal hysterectomy. (3) Acute torsion of pedicle of an ovarian cyst with hæmorrhage. The symptoms simulated those of a case of extra-uterine gestation. (4) Extra-uterine gestation at 2 months. The condition presented symptoms resembling those of an ovarian cyst with torsion of the pedicle. (5) Ruptured tubal gestation. (6) Microscopic section of a uterus showing fibrosis. The patient was 34 years of age, and the uterus was finally removed on account of intractable hæmorrhage.

A lantern demonstration followed. Dr. Pirie exhibited numerous excellent radiograms of bones showing growth after resection, bismuth injections into abscess cavities, fracture of the neck of the femur, etc.

Mr. Greig demonstrated slides of several interesting and unusual cases. In particular he read notes of carcinoma of the frontal sinus in a man who had a definite syphilitic history. Proptosis developed with fixation of the eyes in strabismus. Pupil reaction was lost. Mercury and iodide of potash were given without benefit. A piece of the tumour was removed and ascertained to be cancerous. He died a month later. There was no glandular involvement and no metastasis. Mr. Greig contrasted this case with another of intra-nasal carcinoma starting at the root of the nose. Its duration from the time of first complaint was about nine weeks. There was extensive and rapid metastasis, tumours making their appearance in various parts of the body. Two admirable slides of the interior of the skull in the latter case were shown. The other photographs illustrated cases of infra-orbital sarcoma, sarcoma of the frontal bone, and recurrent sarcoma of the upper jaw.

Edinburgh Obstetrical Society.

THE third meeting of the Society was held on 10th January 1912, Dr. Haig Ferguson, President, in the chair.

Dr. Haultain showed a large fibroid growing anteriorly from the supra-vaginal portion of the cervix, with peculiar purple-coloured cystic-like portion; also the skiagraph of the pelvis of a woman who had previously had a serious hunting accident. The patient having subsequently married, the skiagraph was taken to ascertain the condition of the pelvis with reference to child-bearing, and showed clearly the whole of the right side of the pelvis pushed inwards.

Dr. Brewis showed—(1) A very large myoma growing between the layers of the broad ligament. (2) Two examples of uterine sarcoma, removed respec-

tively by vaginal and abdominal hysterectomy. (3) Uterus removed for multiple fibroid growths from patient who had previously a papillomatous ovarian tumour removed; no papillomata were found at present operation, but interior of uterus showed adeno-carcinomatous changes. (4) Ruptured tubal pregnancy and strangulated ovarian tumour removed at same time from same patient.

The President read a note on a case of pyosalpinx successfully removed by abdominal section during the puerperium. Pyosalpinx cases during pregnancy and puerperium were difficult to diagnose, and were liable to be slumped under the category of cellulitis. Not all the cases of puerperal cellulitis were secondary to tubal mischief, as cervical lacerations gave rise to many of them; but where the tenderness and swelling were high up in the pelvis the tubes were not infrequently at fault. Urgency of symptoms in such cases did not often call for abdominal section, so that it was difficult to have definite evidence of the frequency of such a condition. One of the earliest cases of pyosalpinx removed during the puerperium was recorded by the late Dr. Milne Murray while President of the Edinburgh Obstetrical Society (*Transactions*, vol. xxv. p. 38). Cases had since then been recorded more frequently, probably owing to more accurate diagnosis. The President had previously (in 1906) recorded a case where he removed a puerperal uterus for multiple abscesses in its walls, associated with acute pyosalpinx. Many cases doubtless recovered perfectly without operation, but in severe cases the chances of recovery and ultimate restoration to health were greatly increased by timely operation in suitable cases.

Two kinds of cases presented themselves:—(1) Those originating before labour and becoming exacerbated in the puerperium, as in Milne Murray's and the author's case. (2) Those commencing in the puerperium *de novo* from direct infection.

In the first class the condition was more local and more amenable to operative interference. The second class were frequently part of a puerperal infection, often general, and it was often difficult to determine if the tube were primarily affected, or even in some cases affected at all.

The author had found the height of the swelling in the broad ligament, as determined by bimanual examination, a good practical guide in such cases. The higher it was the more likely to be tubal or mainly tubal. To establish a certain diagnosis in such cases one must see them *early*, as subsequent cellulitis often developed in the lower part of the broad ligament. If swelling commenced in the base of the broad ligament and extended upwards and outwards it was probably the result of infection from a cervical tear and not tubal in origin.

In cases where tubal inflammation was recognised or suspected during pregnancy, and verified by bimanual examination immediately post-partum, the conditions were very apparent and the indications for operation pretty clear. The question *when* to step in in such cases depended upon urgency of symptoms, the rapidity of spread of inflammatory mischief to surrounding parts, or on the supervention of symptoms of general infection resulting from a possible burst or leaking pyosalpinx. Operation during acute symptoms was better avoided if possible. It was better to wait till these subsided, and then operate if the physical signs and symptoms still called for interference. In these cases the author had not found a blood examination of great assistance unless the leucocyte count rose very rapidly.

The record of the President's case was then given as follows:—Woman, æt. 28, admitted to Royal Maternity Hospital, 29th October 1911. One previous uncomplicated labour two years ago; no history of any gonorrhœal infection. On July 1911, about 5th month of pregnancy, began to have aching pain in left side, more severe and more frequent towards end of August. Pain was almost constant, but less severe, for three weeks before delivery. Ten days before delivery she had a fall in the sitting posture and began to complain of pain in the perineum, worse during defæcation. Labour occurred on 29th October and was easy, child manifestly premature. On 3rd day of puerperium temperature was 101° F., pulse 100, breasts full and tender, no abdominal pain or tenderness. On 4th day breasts better, temperature came down, lochia and involution normal. On 5th day pulse and temperature about 100, and vague pelvic discomfort on left side. On 6th day severe pain over left iliac fossa. Temperature rose to 102, and marked tenderness in left iliac region. On bimanual examination a soft round exquisitely tender swelling, about size of a small plum, was made out in left lateral fornix, movable apart from the uterus. An ice-bag gave some relief. On 7th day temperature kept about 101° F., pulse over 100; pain very severe at intervals, and chilly feelings. On 8th day temperature 100° F. to 101·2° F., pulse 104; pain less, bowels moved. On 9th day pain very severe; sent to Royal Infirmary. After waiting for subsidence of acute symptoms operation was performed on 15th November. During separation of adhesions the tube gave way and some pus escaped. The affected tube and ovary were removed, and drainage effected by gauze through the vagina. Apart from some infection of the wound the patient made a satisfactory recovery.

The pus was found to yield a mixed culture of streptococcus pyogenes and staphylococcus pyogenes aureus. The pathological report on the tube itself showed it to have been affected for some months. The fact that in spite of this acute symptoms did not develop till the 5th day post-partum was probably explained by what Dr. Milne Murray described as some subtle change in the vital processes or tissue metabolism which followed the passage from the state of pregnancy to the state of the puerperium.

Dr. Barbour thought infection in this case had probably taken place before pregnancy or was a septic infection during the puerperium. One was not justified in concluding that a swelling was tubal simply because it was felt high up in the broad ligament, as septic cellulitic masses frequently began there. One was not frequently justified in opening the abdomen for puerperal conditions.

Dr. Lackie recalled that Dr. Milne Murray's case was characterised by absence of physical signs before operation, with exception of excessive tenderness and the marked illness of the patient.

Dr. Haultain thought there was no special contra-indication to operating during the puerperium if symptoms demanded it. He considered the mobility of the swelling of more value than its height for diagnosis. He could not account for the infection at all in the President's case in view of the presence of streptococci in the pus.

Dr. James Ritchie referred to a case in which acute symptoms developed 2 days after parturition in which tubal symptoms were present in the later months of pregnancy. He wondered if it would not be better to operate in such cases before the confinement.

Dr. James Young referred to a case in which symptoms of pyosalpinx developed after abortion. Acute symptoms following a month later, the case was operated on, and the pus was found to be sterile.

Dr. Watson recalled a case of double gonococcal pyosalpinx after labour which recovered perfectly under expectant treatment.

Dr. Brewis said that he considered cellulitis exceedingly rare in the puerperium, most of the cases so called being really tubal. Acute symptoms practically always indicated that the pus was not sterile. Many cases got well without operation, but undoubtedly many cases demanded it. Early cases should be removed from above, later cases dealt with from below.

The President, in replying, emphasised his opinion that if a swelling was high and movable, 10 chances to 1 it was tubal. He could not explain the streptococci. In answer to Dr. Ritchie, the difficulty about operating during pregnancy was that the diagnosis was so uncertain at that time.

Dr. Berry Hart then read his paper on "Numan, the Veterinarian and Comparative Anatomist of Utrecht : a Forgotten Observer on the Free-Martin " (with limelight demonstration). This paper will appear in the *Journal*.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

By EDWIN MATTHEW, M.D., F.R.C.P.,
Assistant-Physician to the Royal Infirmary.

THE NUCLEUS OF THE NEUTROPHIL LEUCOCYTE AND ITS RELATION TO DISEASE.

THE nucleus of the neutrophil leucocyte may be single, but these cells may, and do, contain in health 2, 3, 4, or 5 nuclei. Arneth in 1905 first described a classification of the leucocytes according to the numbers of nuclei or nuclear parts in each cell. Each polymorph, according to Arneth, enters the blood as a cell having a single nucleus or a single lobe to the nucleus. As they mature a process of division of the nucleus goes on, the oldest neutrophils having nuclei with 5 lobes or pieces. Arneth accordingly pointed out that the neutrophil leucocytes can be divided into five classes according to the number of nuclei, and in a count of 100 cells a normal neutrophil blood picture would be—

Class 1.	Class 2.	Class 3.	Class 4.	Class 5.
5	26	36	28	5

the class indicating the number of nuclei in the cell.

Many others have worked out the proportions in normal blood. Thus Kegan of Boston gives as his numbers 5, 19, 46, 25, 5, and Margaret Lewis of Baltimore, 5, 22, 42, 26, 5.

In certain diseases marked changes take place in these figures. These changes have been chiefly and very completely worked out for tuberculosis. In this condition there takes place what has been described as a "shift to the left" in the figures, *i.e.* the numbers increase in classes 1 and 2 and diminish in classes 3, 4, and 5. A typical count for a tuberculous case would be—

Class 1.	Class 2.	Class 3.	Class 4.	Class 5.
12	48	30	10	0

and in advanced cases one gets figures as follows:—47, 48, 5, 0, or 55, 35, 9, 1, 0, the last example indicating 55 neutrophils with one nucleus, 35 with two nuclei, 9 with three nuclei, 1 with four nuclei, and none with five nuclei. In every case of advanced phthisis and in tuberculous conditions of the abdominal cavity this shift to the left is observed, and from these changes in the figures in tuberculous cases we get valuable information (though not from a diagnostic point of view), for the prognosis in any particular case can be more accurately gauged by the change in the neutrophil picture than by any other clinical means. A case that progressively and persistently shows a shift to the left we can say will certainly die, while improvement can be clearly deduced in a case where the shift to the left gradually returns towards the right.

For example a young woman with phthisis showed a count of—

Class 1.	Class 2.	Class 3.	Class 4.	Class 5.
9	38	36	16	1

She was treated with tuberculin, and in a few months she returned to work, and her count was 5, 21, 43, 26, 5—a normal count. From the large number of observations that have been made it is undoubted that an estimation of the classes of neutrophils is of immense help in forming a prognosis in tuberculous cases. It was hoped at one time that the blood picture would prove of value also in detecting incipient cases where the clinical signs were not clear, but, unfortunately, it does not give any help in this direction. From numerous counts it can be definitely stated that cases with even a slight tuberculous lesion, and a blood picture that shows a shift to the left, always do badly; on the other hand, cases with extensive lesions and a normal or nearly normal neutrophil picture show a marked tendency to resist the disease. Also cases that apparently are cured clinically are still insecure if the neutrophil picture has not returned to normal.

Observations have also been made in other conditions—pneumonia, appendicitis, endocarditis, and in blood diseases. In pneumonia the results, so far, are not definite from a statistical point of view, but here,

again, the neutrophil picture is of value in prognosis. In a case of delayed resolution it will definitely determine whether the case is tuberculous or not. In a number of cases of pneumonia the picture showed a marked shift to the right with nuclei containing 7 or 8 pieces. Such cases showed purulent infection at the post-mortem examination. Cases of pneumonia which run a normal course have a moderate shift to the left, which returns to normal during resolution. In six cases recorded by Margaret Lewis, where there was delayed resolution, a tuberculous neutrophil picture appeared, and, later, tubercle bacilli were found in the sputum.

In Kegan's and Margaret Lewis's appendicitis cases the neutrophil picture showed a decided shift to the right, and nuclei with 6, 7, and 8 lobes were present. At the operation these cases had a purulent condition of the appendix.

In diseases of the blood—chlorosis, pernicious and secondary anæmias and leukæmias—there is no change in the neutrophil picture. The conclusions that may be drawn from the observations at present recorded are summed up by Lewis as follows:—

The neutrophil is an organism which reacts quickly and definitely to its environment, and the condition of the nucleus, as shown by the number of lobes, may be taken as an indication of the condition of the neutrophil. Under normal conditions the nucleus does not show more than five lobes, but the presence of certain abnormal conditions may cause it to show as many as 8 or 10 lobes, while certain other conditions, such as tuberculosis, may prevent its having more than 1, 2, or 3 lobes. These changes of the nucleus and the number of white cells form a picture which can be used to determine the condition of the patient.

This neutrophil blood picture, together with the differential blood count, is of great value in prognosis in tuberculosis but not of much value in diagnosis. It is of value in determining the presence of pyogenic bacteria in pneumonia, or the presence of an abscess, and may be of value in detecting a purulent condition of the appendix.

It is of especial value in the prognosis of any disease where it is of use to determine the metabolic activity of the patient or the resistance to disease, as any condition of lowered vitality is quickly shown by this blood picture.

A NEW DIAGNOSTIC REFLEX SIGN IN TYPHOID FEVER.

Burke, in the *New York Medical Journal* of last month, describes a sign which he has found of help in the early stages of typhoid fever. It is elicited in the following manner:—The patient's arm is bared to the shoulder and lies extended on the bed. The middle finger and thumb of one hand are placed over the middle of the biceps muscle,

the finger on the inner margin and the thumb on the outer. Firm pressure is made by the finger and thumb on the muscle, and keeping up the pressure the hand is briskly raised or pulled upwards, so that on leaving the muscle the thumb and finger come together with a slight concussion. If the reflex is present the result is a fibrillary contraction of that part of the biceps traversed by the thumb and finger, producing an oval ridge on the muscle. The ridge disappears only slowly. This sign Burke found present in every case of typhoid fever, and practically absent in every other condition in which it was looked for. It is best marked at the height of the fever, and not so pronounced during the first week. It gradually lessens during convalescence.

SURGERY.

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“CÆCUM MOBILE.”

It is no infrequent occurrence for the surgeon to operate on a case in which the diagnosis of chronic appendicitis has been made and to find the appendix showing no definite pathological lesion. After the removal of an apparently normal appendix the patient is relieved of his symptoms in many cases; in a certain number, however, no relief is obtained.

In 1908 Wilms drew attention to the fact that in most of these cases the pathological condition consists in an undue mobility of the cæcum (“cæcum mobile”), that the appendix is only indirectly affected, and that, to obtain complete relief, not only must the appendix be removed, but the cæcum must be fixed in the right iliac fossa.

It has been definitely established that the appendix itself has no afferent pain-conducting nerve fibres, and thus very pronounced pathological changes may take place in it without giving rise to pain, so long as the serous coat is not involved and no lymphangitis in the meso-appendix is present. The pain-conducting fibres commence in the meso-appendix, and thus swelling or dragging on this fold produces pain or discomfort. Traction on the meso-appendix, from one cause or another, is thus more likely to give symptoms than is a chronic inflammation in the appendix itself.

Cases of “cæcum mobile” are characterised by chronic constipation, with attacks of diarrhoea at intervals, and spasms of colicky pain in the right side of the abdomen, often accompanied by vomiting. On palpation, tenderness, gurgling, a feeling of resistance, and sometimes a firm sausage-like swelling in the region of the cæcum, can usually be made

out. X-ray examination after a bismuth meal shows that the bowel content is retained in the cæcum and lower part of the ascending colon for 12 to 24 hours, or even longer, as if there were some functional obstruction to the emptying of the cæcum.

According to Wilms two varieties of movable cæcum causing symptoms are to be distinguished. The one is where the cæcum is freely mobile but the appendix is comparatively fixed by a short meso-appendix. In such cases a full cæcum, sagging down, stretches the meso-appendix, and causes a dragging painful sensation. In this condition the removal of the appendix will give, as a rule, almost complete relief. The appendix in these cases may become inflamed as the result of kinking; the primary cause of the trouble, however, is the undue mobility of the cæcum. The second class of case is one in which the appendix hangs free, has a long mesentery, and is obviously not implicated, but where the cæcum is large and movable, and, apparently as the result of some chronic irritation in the colon, undergoes from time to time spastic contractions which cause pain by dragging on the nerves in the meso-cæcum. This condition he describes as "typhlo-spasm." Physicians have shown that such cases may often be relieved of both pain and constipation by the administration of sedative drugs, more especially belladonna, and only after prolonged medical treatment has failed to relieve should surgical interference be undertaken.

The operation performed by Wilms for movable cæcum is the raising of a flap of peritoneum from the right iliac fossa so as to form an extra-peritoneal pocket into which the cæcum is fixed. He has found that not only is the patient's pain relieved by this fixation of the cæcum, but that the constipation is cured and the onward passage of faecal matter from the cæcum, as evidenced by repeated X-ray examinations, greatly accelerated.

Stierlin records 52 cases of "cæcum mobile" treated by appendectomy and cæcopexy in Wilms's clinic. In 43 of the cases the after-history was obtained, and 75 per cent. reported themselves cured of both pain and constipation, 16 per cent. were improved, and 9 per cent. still complained of their old symptoms.

Klose distinguishes two varieties of movable cæcum which give rise to similar clinical signs. The one variety results from constipation and inflammatory changes in the cæcum, and this, if taken in time, may be cured by medical means; the other is the result of arrested development, and always requires surgical treatment. He recommends an intra-peritoneal cæcopexy for these cases.

Fischler believes that the symptom-complex described by Wilms is accounted for more by an atonic condition of the caecal wall, the result of a local enteritis, than by the mobility of the cæcum, and he prefers to designate the condition "typhlatonie."

Bircher has found that the conditions described by Wilms as

"cæcum mobile," and by Fischler as "typhlatonic," are clinically indistinguishable, and he treats these cases by coloplication—reducing the lumen of the large cæcum by a vertical tuck.

Hausmann, who independently described this condition as "wandering cæcum," has made several contributions to the literature on the subject. He treats these cases with oil enemata and abdominal massage, and, where these measures fail, by cæcopexy.

Sick has found in many of these cases that the appendix has a short mesentery, and forms, as it were, a tether to the movable cæcum, and he believes that the painful attacks are due to a partial volvulus of the cæcum round this fixed point. He is no warm supporter of cæcopexy.

In cases presenting the symptom-complex of Wilms, Hofmeister has demonstrated the presence of adhesions constricting the ascending colon, and by dividing these and thus still further freeing the cæcum has succeeded in relieving the symptoms.

Dreyer, from the examination of a large number of bodies, concludes that a movable cæcum is not pathological, it being present in 67 per cent. of the subjects examined, and condemns the operation of cæcopexy as being unphysiological.

Lastly, Hochenegg insists that the symptoms which are usually referred to a chronic inflammation of the appendix are of a purely mechanical origin, and that the trouble which the appendix has been causing in any given case can only be gauged by the anatomical disposition and relations of the appendix to neighbouring organs in the abdomen, and not by the degree of pathological change found in the excised appendix.

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GALL-BLADDER SURGERY.

The ultimate results of operative interference for pathological lesions of the biliary passages and the factors hostile to success in gall-bladder surgery formed the subjects of two papers and of an interesting discussion in the section of surgery at the annual meeting of the American Medical Association held in June 1911.

Stanton (*Journ. of the Amer. Med. Assoc.*, 5th August 1911) gave a critical analysis of the results obtained in 350 operative cases, the majority of which were from Ochsner's clinic in Chicago. In 245 cases gall-stones were removed from the gall-bladder or ducts, or

both. In 85 per cent. of these cases the ultimate results were all that could be desired, in 9 per cent. improvement followed the operation, and in 6 per cent. no improvement resulted. Out of the 107 uncomplicated cases of stones in the gall-bladder there were 94.6 per cent. cures—a strong argument in favour of early operation in these cases.

Thirty-two patients had stones in the cystic duct, and of these 90 per cent. were cured by operation. Nineteen patients had stones in the common duct, and 13 of these were cured completely, 5 were greatly improved, and 1 was no better after operation. Of 11 patients who had gall-stones along with chronic pancreatitis, 10 reported themselves cured of symptoms after operation.

An analysis of the symptoms and causes producing the discomfort in the patients not cured gave some instructive data. Sixteen patients complained of symptoms almost certainly due to the presence of gall-stones which had either been overlooked at, or had formed subsequent to, the operation. Ten patients complained of symptoms referable to adhesions.

Of 99 patients operated on for cholecystitis without gall-stones only 46 reported themselves cured, and in the case of some of these the return to health was a gradual one, extending over months or years. Thirty-three patients reported themselves as improved, and 19 stated that their trouble was either not benefited or was made worse by the operation. Stanton is of the opinion that cases of cholecystitis are probably better treated by medical means than by surgical interference.

Davies (*Journ. of Amer. Med. Assoc.*, 5th August 1911) investigated the factors which made for non-success after operations on the biliary passages. He believes that to leave behind a gall-bladder, the walls of which have lost to a greater or less degree their functional contractile power, is to menace the patient's chance of permanent recovery. When the gall-bladder is to be drained it should never be anchored to the parietal peritoneum, as such fixation interferes with the subsequent functional utility of this viscus and not infrequently causes discomfort to the patient.

In the vast majority of cases peritoneal drainage is unnecessary and should be avoided, as it favours the formation of adhesions which prevent the complete relief of symptoms. In cases with infection of the ducts, drainage should be prolonged over several weeks; the usual mistake in the treatment of such cases is the withdrawal of the drainage tube before the bile has become sterile. Treatment should not cease with the discharge of the patient from the care of the surgeon, but a Carlsbad "cure" or some humbler equivalent of it should be instituted in all cases.

In the discussion several speakers alluded to the importance of

determining the presence of coincident pancreatitis. The presence of this complication calls for more prolonged drainage than would otherwise be required; this is particularly true in cases of cholecystitis without gall-stones, for according to Ochsner there is in many of these cases a vicious circle, the pancreatitis obstructing the biliary flow and so favouring cholecystitis, and the products of the latter as they pass through the common duct causing increased irritation of the pancreas.

The final results after gall-bladder operations tend to show that cholecystectomy should seldom be the operation of choice in gall-stone cases, but that it should be reserved for cases of chronic cystic duct obstruction and cases in which the gall-bladder is so diseased that it is technically a safer and easier operation to perform than is cholecystostomy.

PROSTATECTOMY.

Judd (*Journ. of Amer. Med. Assoc.*, 5th August 1911) gives a review of 542 cases of prostatectomy from the Mayo clinic. Four hundred and sixty-one operations were performed for benign hypertrophy of the prostate, 74 for cancer, and 7 for tuberculosis. The relative frequency of cancer and simple hypertrophy was approximately 1 in 6. The average duration of symptoms before the patient came for operation was 5.96 years.

A clear distinction is drawn between the primary symptoms of obstruction to the outflow of urine from the bladder and the secondary symptoms due to damming back in the ureters with renal insufficiency. If there be little residual urine in a case with marked secondary symptoms but with no great difficulty in voiding urine, little or no benefit will follow a prostatectomy, no matter how large the prostate. During the past few years the operative mortality has been considerably reduced, and a more satisfactory convalescence and better after-results have been obtained by spending more time in preparing cases for operation.

The treatment is divided into two stages, the first stage consisting in the relief of the secondary symptoms. This is effected by continuous drainage of the bladder by a catheter either per urethram or through a suprapubic stab-wound. For several days the patient is encouraged to drink great quantities of fluid in order that the impaired renal function may be restored. Thus the effect of the prostatic obstruction is overcome before the cause is removed.

Cystoscopic examination has been carried out in over 95 per cent. of cases during the last few years, and has been found to be of the greatest value in differentiating between tumours, cystitis, diverticula, in determining the presence of stones, and in selecting the type of operation for a given case.

The perineal operation was usually employed because the convalescence following this method was shorter and easier. If, however, the cystoscope revealed the presence of a stone of some size in the bladder, or if the median or lateral lobes were enlarged so that they formed an intra-vesical tumour, or if on rectal examination the finger could not reach the upper border of the gland, the suprapubic operation was performed.

In the cases of benign hypertrophy operated on the perineal operation was employed in 323 and the suprapubic operation in 140 cases. In the cancer cases the perineal operation was employed in 50 cases, the suprapubic route in 19.

Operation was undertaken in cases of carcinoma only when the patient's chief complaint was difficulty in voiding urine, and it was found that in most of these cases, even when the removal was palpably incomplete, the immediate result was just as good as in the benign cases. Where carcinoma was diagnosed, but where there was no definite urinary obstruction, the patients having sought advice on account of radiating pains through the pelvis and back, operation was not performed. The after-history was obtained in 90 per cent. of cases. There were no cases of incontinence of urine after the suprapubic operation for benign hypertrophy. Seven of the perineal cases had incontinence after operation, and in 11 cases the retentive power was not strong. In the latter cases the patients were able to retain urine for several hours before starting to dribble. The exercises suggested by Alexander were found to be of great value in aiding recovery of control. These consist in filling the bladder and, as soon as dribbling begins, allowing the patient to pass part of the fluid, holding the remainder as long as possible, then passing more, and so on until the bladder is empty.

The average duration of the fistulous opening in perineal cases was 21 days, in suprapubic cases 40 days. There were 3 cases of persistent fistula in the suprapubic series and 6 cases of similar trouble in the perineal series; of the latter, however, 4 had healed, had remained whole for some time, and had then reopened.

Fourteen of the 542 patients returned on account of the formation of stones in the bladder after the removal of the prostate. At the time of writing 60 per cent. of the entire series of cases were living and enjoying reasonably good health. Of the 81 patients who had died since leaving hospital, 29 died before the end of the second month. Autopsies were performed in nearly all of these cases, and in all, old-standing kidney lesions with superimposed acute nephritis were found.

Of the malignant cases 30 were reported as having died, 1 patient was alive and well four and a half years after operation, 1 was alive three years, 4 two years, and 6 over one year after operation.

DISEASES OF CHILDREN.

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LATE PROGNOSIS IN ACUTE NEPHRITIS.¹

Is an attack of acute nephritis in early life often the starting-point of a chronic nephritis which only declares itself in later years? Is the cure of an acute nephritis succeeded by pathological changes in other organs, more particularly those connected with the circulation? Are patients who have suffered from acute nephritis predisposed to orthostatic albuminuria?

In early life acute nephritis is relatively a much more common disease than chronic nephritis; in later life chronic nephritis is the more common. A great difficulty in considering the relationship between the two conditions lies in the fact that an accurate diagnosis is not always easy, and the common occurrence of orthostatic albuminuria renders the problem still more complex.

In support of the contention that characteristic orthostatic albuminuria is caused by an inflammatory condition of the kidneys, many observers have pointed to the nature of the urinary deposit in these cases and to secondary effects on the circulation, but recent observations have not substantiated these findings.

In youth long-continued cases of albuminuria are often met with in which an inflammatory condition of the kidney is certainly not the cause.

To turn to true nephritis—if the distinction between the acute and chronic condition is regarded merely as the lapse of time, such a distinction must necessarily be purely arbitrary, but, on the other hand, if chronic nephritis be regarded as a progressive disease, it depends for its diagnosis not only on consideration of the duration of symptoms, but on the character and prognosis of the disease, while the typical acute condition may be regarded as a disease which either kills quickly or from which the patient entirely recovers in the course of a month or two.

Can the one condition eventually result in the other? If so, does this occur often?

In childhood acute nephritis following scarlet fever is the most common form of acute nephritis, and consequently it is specially interesting to study this form.

In most text-books it is stated that acute nephritis following scarlet fever sometimes develops eventually into chronic nephritis.

This statement, according to Ernberg, appears to be based on two

misconceptions. The first is the failure to realise that some cases of acute nephritis last an unusually long time and may eventually cause death; and the second is, that whereas in later life when a patient dies from chronic nephritis it is often difficult to determine the exact cause of the condition and an acute nephritis in childhood is blamed, yet no convincing proof can be adduced that there is any connection whatever between the two conditions. Extremely good health may have been enjoyed between the periods of the two diseases, and even if albuminuria were constantly present, it may have been an ortho-static albuminuria quite distinct from either the acute or the chronic nephritis.

A valuable method of studying the question is to examine large numbers of adults who suffered from acute nephritis in childhood. These observations must include exact determination of the symptoms of the original disease and of the conditions at the later examination (preferably more than one), and also consideration of the health of the patient during the intervening years. In examination of the urinary deposit consideration must also be had of the fact that if the urine is free from albumen and the individual examined generally healthy, such examination is largely valueless, as we cannot judge whether the findings are pathological or not. Casts, etc., occur in the urine of healthy persons after gymnastics, etc.

The work of Ernberg relates to the examination of a large number of individuals who were treated for acute nephritis in youth and examined 16 to 23 years later. During the years 1885 to 1892 106 cases of acute nephritis in children under 15 years of age were treated in hospital, and 50 cases of acute nephritis in young people between 15 and 30 years of age. In the later examination of these cases the urine was carefully and usually repeatedly examined, the heart also. In most of them the blood-pressure was tested by Recklinghausen's modification of Riva-Rocci's apparatus.

Seventeen patients under 15 years of age died in hospital from the original disease, and of the 89 who left hospital 61 were later examined. Twelve patients over 15 years of age died in hospital from the original disease, and of the 38 who left hospital 18 were examined later.

Of those who as children suffered from acute nephritis and survived, 61 out of 89 were examined 16 to 23 years later. Of these 43 showed no bad effects whatever of their previous acute nephritis, and practically the same result held good for the patients over 15 years of age.

As a result of his observations the author concludes that acute nephritis in youth is a disease to which the patient rapidly succumbs or from which he completely recovers. Without being able to state positively that the condition never develops into a fatal chronic nephritis, he considers that everything points to this occurring so

seldom that it is unnecessary to consider such a possibility when dealing with the prognosis in a case of acute nephritis in youth. Acute nephritis in children or young people as a rule has no serious sequelæ in later life. The acute nephritis may be followed for some time during the convalescence, and later sound health of the patient, by albuminuria, but this symptom is of no serious importance in the absence of other signs or symptoms of disease, and acute nephritis does not predispose to orthostatic albuminuria.

SERUM DIAGNOSIS IN CONGENITAL SYPHILIS.

Recent work on this subject by Leroux and Labbé² from the Pasteur Institute is of considerable interest. They employed the test of Hecht, controlled by that of Wassermann.

From the result of repeated observations on the same individuals they conclude that the serum test is of undoubted value, as when carried out in the same laboratory 77 per cent. of cases repeat the first reaction at a subsequent period.

One hundred and eight cases of children of syphilitic parentage were examined. When the congenital syphilis is in an active state the serum test is almost always positive, while in congenital parasymphilis it is often negative. In healthy children of syphilitic parentage it is always negative.

Passing from consideration of syphilitic children to that of their parents it was found, as a rule, that syphilis in them was at the time of examination without clinical manifestations.

Of 19 fathers of congenital syphilitics tested a positive reaction was obtained in 42 per cent. of cases. In 7 cases the fathers denied syphilis and the test was negative.

Seventy-three mothers of congenital syphilitics were tested and in 71 per cent. of the cases the reaction was positive.

This difference between the figures for fathers and mothers may be largely explained by the paternal syphilis usually being recognised and treated, whereas the maternal is usually unrecognised and untreated. Of the 73 mothers 21 admitted syphilitic infection, while in 52 cases the condition was unrecognised, but in both classes of cases the percentage of positive serum reactions was practically the same. In the 52 unrecognised cases of syphilis in the mother there had not been the least sign of the disease, and it would consequently appear that maternal syphilis is more frequently a "syphilis conceptionnelle" than a syphilis acquired by direct infection from the father.

Further, the mothers of congenital syphilitic infants are themselves infected in the vast majority of cases—at the very least in 76 per cent. of cases—and this explains Colles's law.

In the labouring classes, among which these observations were made,

it is usually the father who introduces syphilis into the family, but it is the subsequent maternal syphilis which exerts the greatest influence on the child. Active maternal syphilis with positive serum test usually causes virulent syphilis in the child. When the maternal syphilis is not clinically demonstrable and the serum test is negative the child usually shows signs of parasymphilis or is healthy.

In cases where there is paternal syphilis but the mother appears free from the disease and has a negative serum reaction the child shows only signs of parasymphilis and has a negative serum reaction or is healthy.

In 14 cases the serum test was applied to the whole family, and the following conclusions were arrived at from the results obtained:— When syphilis is active in both father and mother and the serum reaction positive the child almost always has virulent syphilis with positive serum reaction. When syphilis is not clinically demonstrable in father or mother and the serum reaction is negative the children are almost always healthy or only suffer from parasymphilis, etc.

When syphilis is not clinically evident in the father and the serum reaction is negative, but syphilis in the mother is active and the serum reaction positive, the child usually suffers from virulent syphilis with positive serum reaction, but may be healthy with negative serum reaction.

When paternal syphilis is active with positive serum reaction, but maternal syphilis is not evident and the serum reaction negative, the child is healthy or shows only signs of parasymphilis with negative serum reaction.

From none of the observations was any evidence forthcoming to show that a father with active syphilis and with positive serum reaction can give birth to a child with active syphilis and positive serum reaction without infection of the mother having taken place.

Treatment does not appear to affect the serum reaction in any constant manner. The serum reaction is chiefly of value with regard to the question of cure or immunity. Clinical evidence must control diagnosis, prognosis, and treatment.

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DERMATOLOGY.

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THE TREATMENT OF SYCOSIS VULGARIS.

SYCOSIS due to the staphylococcus has been generally looked upon as an ailment difficult to cure. The thorough removal of all diseased hairs has been thought a necessary preliminary procedure. This is the reason why the X-rays have received so much laudation of late, since by their action the extraction of the hairs is rendered easy. Junkermann (*Monatsh. f. Prakt. Dermat.*, Hamburg, 1st November 1911) suggests a simple method which he has found successful without epilation or the use of the X-rays. He discovered that in iodine we possess a pre-eminently valuable remedy for the cure of sycosis vulgaris. In the early times of his experience with it he recalls the case of a patient who had suffered for five years from a severe sycosis, and who had been under the care of distinguished dermatologists without result. He was charmed when in eight days his face was already smooth, and in a month he was discharged from hospital completely well. Junkermann has now treated many cases without failure. Of course when the patient is not under close observation very careful instructions must be given for his guidance. The hairs should be shaved quite close every three days (he has wholly abandoned epilation in any form). Should shaving be out of the question on account of crusting, then, after clipping the hairs short, he employs at first a weak iodine and iodide of potassium ointment (R. Iodi puri 0·2, Potassii iodidi 1·0, Aq. distillat. 4·0, Lanolini anhyd. 10·0, Vasellini ad 50·0). This is continued till all the crusts have been got rid of. Then he paints each individual pustule with pure tincture of iodine, and dusts over all parts of the face with 5 per cent. salicylic powder. If the pustules are so closely set that scarcely any normal skin is visible between, then the whole surface is first painted with diluted tincture of iodine—equal parts of tincture and spirit ; next with stronger—ten parts tincture and five spirit. In this way most of the pustules disappear, and only the largest and most obstinate remain to be dealt with by the pure tincture. Sometimes the skin becomes so dry and brittle as a result of the painting that it is advisable to apply a weak salicylic ointment at night, spread on lint. To cleanse the face he uses a warm watery solution of borax. The cure is thus a rapid one without interference with business. But still more quickly can relief be afforded if

the patient can give up his occupation and stay in the house. He then bandages the parts at night with a strong salve (R. Iodi puri 0·5-1·0, Potassii iodidi 2·5-5·0, Aq. distillat. 4·0, Lanolini anhyd. 10·0, Vaselini ad 50·0). During the day cold compresses of camomile tea are applied. After a few applications of the bandages impregnated with the salve the cure is so far advanced that only some refractory pustules need to be painted with tincture of iodine. Even the most severe cases do not require more than three to four weeks' treatment, provided the patient is kept properly under control. Still, individual cases need consideration and may call for modification. It is not unimportant if the sycosis is primary or secondary. The symptoms of a seborrhœic dermatitis may outweigh those of the sycosis so much that it may be more advisable to treat these before dealing with the sycosis. Again, the stage reached by the disease and the sensitiveness of the skin are to be borne in mind. A trial of the plan will ensure its adoption.

THE TRANSMISSION OF LEPROSY BY INSECTS.

So long since as 1855 Dr. Hoegh in his report on leprosy in Norway suggested that this disease may be communicable by the *Acarus scabiei*, which there commonly infests the skin of lepers. He mentions a case without hereditary taint where four members of a family living in the Bergen district, 2000 feet above sea-level, in comfortable circumstances, but all severely affected with itch, became in succession attacked (Liveing on *Leprosy*, 1873). Long in Basutoland and Sandes of Robben Island (*Leprosy*, vol. xii. fasc. 2, 1911) suggest that bugs may be the intermediary hosts. Long found a bacillus in the alimentary tract of bugs obtained from huts never inhabited by lepers, but which had been caused to bite lepers in the neighbourhood of leprosy nodules on the face. The bacillus in shape, size, and staining reactions was similar to the *B. lepræ*. Sandes goes further and asserts that leprosy bacilli are undoubtedly imbibed by bugs, and are demonstrable without much difficulty in smears made from the debris of their intestinal canal. No acid-fast bacilli were found in bugs which had not been fed on patients with tuberculous leprosy. Those found in fed bugs were usually isolated, but as many as twelve were found in one field. They do not readily disappear, but can be recognised even sixteen days after the insects had been fed. Some other insects may likewise be carriers. Thus Sandes found acid-fast bacilli in flies, mosquitoes, and fleas which had been allowed access to leprosy patients, but the numbers present in them were quite inconsiderable when compared with bugs. Here it may be noted that bugs dislike naphthalene, and their approach can be guarded against by the precautionary measure of pinning pieces enclosed in muslin to the night-dress on various parts of the body should the presence of bugs be suspected or verified.

THE BLUE NÆVUS.

Among the soft nævi or moles there is a peculiar variety called the blue nævus, since its colour is a more or less pronounced blue. This must be distinguished from the venous angioma, as contrasted with the red or arterial angioma. These are vascular compressible tumours, prominent above the surface. The blue nævus, say Dubreuilh and Petges (*Ann. de dermat. et de syph.*, Paris, October 1911), may appear at any age, under the aspect of a stain or a tumour more or less distinctly blue in colour, prominent or not, but most frequently flat, well defined, and usually not larger than a lentil. It is often met with in association with other nævi, hairy or smooth. It is a benign melanoma, but one cannot say positively that it may not undergo transformation into a malignant one. Histologically it is a dermic neoplasm, formed of large cells more or less charged with pigment. This pigment has the colour of yellow ochre, or is brown or blackish brown and not blue. Tieche has, however, found the pigment blue in some sections. The pigment is deeply seated, and this situation explains the blue colour of the nævus; the granules are seen covered by a considerable thickness of normal corium and by the epidermis. The same effect is produced by tattooing with China ink, which though black in itself is seen in the device as a decided blue stain. This blue nævus, therefore, owes its hue to a uniformly deep pigmentation seen through a certain thickness of normal skin.

PELLAGRA.

Various theories accounting for the cause of pellagra have been enunciated and abandoned. Sofer (*Medicin. Blätter*, Vienna, 4th and 18th March 1911) has again investigated the question. There are two marked phenomena in pellagra—the skin manifestations and the systemic ones. Pellagra, like fagopyrismus, an allied ailment ascribed to buckwheat, belongs to a class of diseases where, besides the original noxa, the added influence of light seems necessary for their production. Since the discovery of Tappeiner of photobiologic sensitisers it has been held that such substances play a part in the origin of pellagra. It is possible, Hausmann holds,—(1) That the sensitiser is introduced in food or in some other way gains admission to the body from without. To this class belong all experimental sensitisers (eosin, hæmatoporphyrin), and this is what probably takes place in pellagra (exogenous sensitisers). (2) But under certain conditions sensitisers may arise from within—of such hæmatoporphyrin is again an example—and so evoke an atmospheric impressibility (endogenous sensitisers). (3) Both modes of origin may combine. (4) Toxines may be developed in the body under the influence of sensitisers by light, which may modify the later symptoms. Raubitschek has instituted many experiments on white and

hybrid mice. He confined them in cages, and exposed some to direct sunlight, while others were kept in darkness. These were fed (*a*) with mixed food, such as green stuffs, bread and milk, etc. ; (*b*) with raw or cooked maize meal (part of good and part of bad quality) ; and (*c*) with cooked rice. The mice kept in the dark stood all the varieties of nutriment without harm, but all the white mice which had only maize or rice and were exposed to light wasted, had staggering movements, showed paralytic symptoms, and died in from eight to twenty-one days. Only the coloured mice survived. But if those mice which began to show morbid symptoms were put in the dark, without any change of diet, they recovered relatively quickly. Raubitschek holds that feeding with maize either of good or bad quality is not itself the cause of pellagra, but that under the influence of sunlight, when maize forms the chief article of diet, probably from the constituents of the grain, which are soluble in alcohol, a noxa arises in parts of the skin so exposed, which not only produces the local cutaneous appearances, but acts deleteriously on the whole body. Hausmann observes in this connection that white mice which have been fed on hæmatoporphyrin, a remarkably active sensitiser, can be kept alive, even if exposed to most intense light, if time is allowed for the organism to get rid of the sensitiser before beginning the illumination. Since the erythema of pellagra begins as a rule in April or May, it would seem desirable to limit the use of maize even from the first days of March, so as not to expose the person while under the influence of a strong sensitiser to the rays of the spring sun. Further, therapeutic efforts must be made to facilitate the excretion of ingested sensitisers as rapidly as possible. Such remedies are indicated as promote the excretion of bile, since a number of fluorescent bodies are discharged through the bile, and sensitisers belong to fluorescent substances.

IODIVAL IN SYPHILIS.

The war against syphilis has recently entered on new phases, and Pohlmann asks (*Berlin. klin. Wochenschr.*, 23rd October 1911) the question whether the rules which have hitherto guided us in treatment may not require revisal. Even after salvarsan has been employed it is generally held that mercurials given by inunction or injection can reach untouched foci, and a negative reaction is only obtained by Wassermann's test after this has been carried out. A further question is, What place does iodine treatment now hold in dealing with syphilis? Ehrlich is of opinion that probably iodine acts by fixation of the toxines and by favouring the discharge of bacterial products. As fresh toxines may be formed, it is desirable to keep the system under the continuous but mild action of iodine. Again, if through the medium of the thyroid gland the poison is eliminated, iodine

in a form soluble in fatty media is preferable to iodide of potassium soluble only in water, and therefore necessitating the administration of large doses to get at fatty or nerve tissues. To attain the best therapeutic effects of iodine in syphilis a preparation should be prescribed in moderate doses, but which can be persevered with for some considerable time. Iodival fulfils these requirements most perfectly of all the newer combinations of iodine, and has this advantage over iodide of potassium, that its action while powerful is uniform, and it only becomes a solution capable of absorption in the small intestine, so that it does not irritate the stomach, which iodide of potassium is so apt to do. Iodival seems to have a specially good influence on nerve syphilis. A series of cases where it was well borne when iodide of potassium for various reasons proved unsuitable are related.

NEW BOOKS.

Reproduction in the Human Female. By JAMES YOUNG, M.D., F.R.C.S. (Edin.). Edinburgh and London: William Green & Sons, 1911. Price £1, 1s.

THE author in his Preface states that this work is an account of the structure of the uterine mucous membrane and the functional changes which it undergoes during menstruation and pregnancy. The contents of the volume are arranged so as to include a description of the processes which take place in the uterus during menstruation and the action of the foetal tissues upon the maternal structures. Descriptions of the earliest human ova are given, including that of an additional specimen in the author's own collection. From the examination of a large number of specimens of uterine mucosa in its upper two-thirds he comes to the conclusion that elastic tissue fibres are rarely present in the stroma or walls of the blood-vessels. Much stress has been laid upon the changes which take place in the mucous membrane of the uterus during pregnancy and menstruation, and the present-day knowledge of the subject is set forth in a clear and lucid form. The author supports the views held by most modern authorities concerning the influence of the ovarian secretion upon the uterus, the agent by which this secretion is conveyed being the blood-stream. The influence of the foetal structures upon the uterus is very fully described. The explanation of the changes occurring in the maternal structures is that they are due to the production of "crystalloids," and an increase in the affinity of the tissues for fluid. The function of the decidual membrane is to prevent an irregular and increasing opening or expansion of the maternal vessels. Its action is inhibitory to the chorionic invasion.

A useful summary is added in most of the chapters which should prove of much convenience. An Appendix on Edema which is given is of much interest, as it discusses the vital and physico-chemical theories as to the passage of fluid from the vessels, the uterine mucosa lending itself to such a study better than any other tissue. The illustrations consisting of drawings and photomicrographs are excellently reproduced, and add greatly to the value of the book. Although the subject-matter of the work may appeal to only a limited number of readers who are interested in or engaged upon researches upon the same lines, it is one which should prove of enormous interest and value to physiologists and gynecologists, as it presents the subject in an extremely readable form. The author shows evidence of long and arduous work upon the histological examination of specimens. We could wish that perhaps in a future edition more room will be given to the chemical aspect of the subject. We heartily congratulate the author on his work, and feel sure it may prove a stimulus to others to follow out the lines of research which he has pointed out.

Auto-Inoculation in Pulmonary Tuberculosis. By MARCUS PATTERSON, M.B., B.S., M.R.C.S., Medical Superintendent at Brompton Hospital, Frimley. London: James Nisbet & Co., Ltd. 1911. Price 21s.

IN this interesting volume which has been recently published, Dr. Patterson sets forth his views on the subject of the treatment of pulmonary tuberculosis. In the preface to the work the author states that his aim is to furnish "*a concise account of new principles and methods based upon his own personal investigations and practical experience.*" We have read the book through with the utmost diligence and care, and we are bound to confess that we have entirely failed to discover any evidence that Dr. Patterson has succeeded in giving to the world any principle of treatment which is new, or indeed any with which we were not long since made acquainted in the writings of Bodington, Brehmer, and others. Whilst the *principle* of treatment dealt with by Dr. Patterson is old and approved, the same need not be said of the "*method*" by which he employs that principle. His "*method*" of scientifically applying rest and exercise in the treatment of pulmonary tuberculosis, on the other hand, is fresh, and furnishes the occasion for the appearance of the present volume.

So far as we are aware the credit of employing "complete immobilisation" or "typhoidal rest," as it is alternately designated, to cases of moderate but obstinate pyrexia belongs to the author; and similarly the exploiting of gardening and navvy work as a means of promoting the process of immunisation to tuberculosis with a view to at once hastening

on the patient's recovery and lessening the working expenses of developing the sanatorium grounds is likewise Dr. Patterson's own idea. Each in its own way is an extension and a valuable extension of the application of principles of treatment whose value has long since been recognised.

It is hardly conceivable that any writer conversant with the literature which deals with the evolution of the open-air treatment of phthisis will feel disposed to grant the claims which the author has set up on his own behalf, and which he assumes when he speaks, as he frequently does, of "my system" of treatment. Under those circumstances we cannot but regret the complete absence in the book of any acknowledgment of the labours of others, in particular of those "giants" of past generations, not to mention Latham and others in our own time, to whom in common with all present-day workers in the field of the treatment of tuberculosis Dr. Patterson owes so much.

Still the work is an important one, and should be in the hands of every sanatorium physician and of many others who are not sanatorium physicians. The system of applying and regulating graduated labour as a means of treatment as carried out by the author is described in sufficient detail to enable anyone to follow and apply it practically. In addition to this the work contains much useful information based upon ten years' observation and experience obtained at the Brompton Sanatorium, Frimley—information both of a clinical and an administrative nature. The text throughout is freely illustrated, and many of the clinical charts are of high value.

It might have been better, keeping in view the advantages associated with a large as compared with a limited circulation, if the work had been produced in a less bulky and consequently less expensive form. Still the volume as it stands is one of real merit, marks an advance in our methods of treatment and in the application of detail in prescribing exercise in the treatment of consumption by open-air methods, and we cordially recommend it to all physicians whose work lies in this sphere of applied medicine.

Conduct and its Disorders, Biologically Considered. By CHARLES ARTHUR MERCIER, M.D., F.R.C.P., F.R.C.S. Pp. 377. London: Macmillan & Co. 1911. Price 10s. net.

THIS book will prove of great value to those interested in education and psychiatry, because it considers conduct in its various aspects from the biological point of view in a systematic manner. Praxiology is the term given to this study, and it resolves itself into the study of action and the study of ends or purposes.

According to the author no act is wholly instinctive, as in all cases

a certain element of reasoning comes in. As examples of this, mention is made of the spinning of a web by the spider and the making of the honeycomb by the bee. In these the instinctive action is modified to suit the exigencies of particular circumstances, and is determined not by the internal factor but by the requirements of the external factor. Instinctive conduct is characterised by its fixity and determinateness, while reasoned conduct adapts itself to circumstances.

The distinction which Dr. Mercier makes between work and play is one which will not be generally accepted. The difference lies in whether the occupation is or is not congenial and pleasant. Work, he says, is doing what you do not like. If an occupation usually enjoyable becomes uncongenial and tiresome it then becomes work, and can no longer be regarded as play.

In discussing self-conservative conduct Dr. Mercier refers to the strange conditions of agoraphobia and claustrophobia. The conduct of the victims of these is explained on biological grounds. Our arboreal ancestors were safe only on the tree-tops, and no enemy could overtake them there. On the ground, however, they were in imminent danger, and the further they ventured from their homes the greater risk did they incur, and consequently they were then ill at ease and apprehensive of harm overtaking them. In those suffering from agoraphobia this state of mind is reproduced. As long as they are near some high object they feel safe, but at other times they are in dread of some impending peril. When the arboreal habits began to be given up in our racial history our ancestors gradually took to living in caves and in hollow trees. They must have realised at first that their retreat might be cut off, and in such situations they would experience a feeling of panic, and an irresistible desire to be in the open must have arisen. This is the state of mind present in the claustrophobe. In both of these disorders there is a revival of an instinct which has been dormant for untold generations.

The book is one which is worthy of study, and will be found of very great interest. The subject with which it deals is an intricate one, but the author has given a most lucid and attractive exposition of it.

A Treatise on Diseases of the Eye. By JOHN ELMER WEEKS, M.D., New York. Pp. 944. London: Henry Kimpton. 1911. Price 30s. net.

IN preparing this volume it has been the design of the author to provide a treatise on ophthalmology that will enable the undergraduate in medicine to obtain a sufficiently comprehensive and trustworthy knowledge of the subject, a book to which the practitioner of medicine may

refer for information regarding questions concerning the eye, and also a book which may be of use to the specialist in ophthalmology.

Chapters I. and II. are devoted to the embryology and anatomy of the eye, while in Chapters III. and IV. the general principles of optics and the systematic examination of the eye are discussed. The part dealing with the examination of the eye, extending to forty-four pages, is thoroughly practical and to the point.

The subsequent chapters are devoted to the various diseases affecting the different parts of the eye and its *adnexa*. Eyelid and lachrymal affections receive liberal treatment, while the chapter dealing with diseases of the conjunctiva is, as anticipated, specially well written. The short but accurate clinical description of Koch-Weeks's conjunctivitis is interesting in view of the discovery by the author of the tiny micro-organism causing the condition. Only those who have had practical experience in growing the Koch-Weeks's bacillus in the laboratory can fully appreciate the greatness of the discovery of this wily micro-organism. It is true that the bacillus was first discovered by Koch in 1883, but he made no cultures. Weeks, three years afterwards, without knowledge of the mention of the bacillus by Koch, cultivated and proved it to be the specific micro-organism by seven inoculations of the human conjunctiva.

Corneal, scleral, and uveal affections are next dealt with, each section being carefully written and up to date. The only defects observed are the somewhat scanty attention given to the treatment of iritis and the low percentage attributed to inherited syphilis as the etiological factor in interstitial keratitis.

Chapters XI. to XXII. are devoted to glaucoma, diseases of the retina, the optic nerve and chiasm, the lens and vitreous, and to the various forms of amblyopias and allied affections. The chapter on glaucoma is not so well done as it should be, especially in view of the revived interest in the etiology of the subject, chiefly through Henderson of Nottingham's valuable researches, which, by the way, are not referred to, and to the recent operative methods of treatment of this ruthless disease.

The remaining chapters are devoted to affections of the eyeball as a whole—the orbit, anomalies of refraction, mobility of the eyeball, ocular conditions associated with general disease, operations, special remedies, and the preparation of specimens in the search for micro-organisms.

Taking the book as a whole we have no hesitation in describing it as a success. It is carefully written and profusely and beautifully illustrated, no fewer than 528 engravings and 25 full-page plates in colour being employed. The paper, printing, and general character of the book leave nothing to be desired, and we heartily recommend it as a safe and reliable guide to students and practitioners alike.

Précis D'Electrothérapie et de Radiothérapie Oculaires. Par le Dr. A. LEPRINCE de Bourges. Pp. 316. Paris: Jules Rousset. 1911. Price fr. 3.50.

THIS small volume consists of three parts. The first deals with a description of the electrical methods applicable in ocular therapeutics, e.g. the utilisation of the faradic, galvanic, and high-frequency currents, together with photo-, radio-, and radium therapy.

The second part is devoted to the various electrical methods of examining the normal and diseased eye-illumination, radioscopy, radiography, localisation, and extraction of foreign bodies from the interior of the eyeball with the electro-magnet.

The third, which is the most important part of the book, consists of the practical application of electro-therapeutics to the eye. Here the various affections of the eye are successively dealt with as well as their relationship to the electrical therapeutic methods at present in vogue.

The text is illustrated by thirty-three figures in the text, while a short bibliography is given at the end of the volume. The book as a whole is a valuable addition to the somewhat scanty literature on the subject, and we have much pleasure in recommending it as a thoroughly useful guide to ocular electro-therapeutics.

Joint Tuberculosis. By LEONARD W. ELY, M.D. Pp. 243. Bristol: John Wright & Sons, Ltd. 1911. Price 12s. 6d.

A CONCISE account of joint tuberculosis in all its aspects is presented in this text-book. The section on pathology, although short, is interesting, and is illustrated by many beautiful photomicrographs from the author's own sections. We miss from this part of the book illustrations of the typical naked-eye changes in the bones and synovial membrane. After a discussion of the general principles of joint tuberculosis the joints are considered regionally. Although the author has not broken much new ground he has presented the subject in an interesting and instructive manner. Many references to the literature of joint tuberculosis are given.

Practical Cystoscopy. By PAUL M. PILCHER, M.D. Pp. 398. With 239 Illustrations. London: W. B. Saunders Co. 1911. Price 24s.

THE author of *Practical Cystoscopy* sets out to give a practical treatise upon cystoscopy based upon personal observations, and the result is a work of much usefulness in the diagnosis of diseases of the bladder and kidneys. Dr. Pilcher gives the technique of cystoscopy in minute detail, and his views are most trustworthy. All the more modern

procedures are accurately described, and the author's conclusions are sound, and given in the clearest and simplest manner. The illustrative cases are judiciously chosen, and the diagrams and coloured illustrations are excellent. We have confidence in recommending this work to the profession as a reliable guide in this important branch of surgery, and we congratulate the author upon the production of the best work on the subject with which we are acquainted. Surgeons desirous of having accurate and up-to-date information upon this department of surgical work should add this volume to their libraries.

Cystoscopy as Adjuvant in Surgery: With an Atlas of Cystoscopic Views.
By Staff-Surgeon Dr. O. RUMPEL. Authorised English translation by Dr. SHEOD of New York. London: Rebman & Co. 1910. Price 42s.

THE coloured illustrations in this work are very beautiful, and demonstrate in realistic fashion the appearances seen by cystoscopy in various conditions; but while they are of value to the beginner in cystoscopic work, they are not in reality of much practical utility. They will assist the junior worker in the interpretation of cystoscopic appearances, but these vary so much and the field is often so different in details that their value is limited. We think this work is worthy of a place in a public medical library, but we question if it is so generally useful as to justify the recommendation of its purchase by individual surgeons. The letterpress is descriptive of the cases from which the cystoscopic views have been taken, and makes these more significant and instructive.

Anæsthesia and Analgesia. By J. D. MORTIMER, M.B., F.R.C.S.
Pp. 276. London: Henry Frowde; Hodder & Stoughton. 1911. Price 6s.

WHILE acknowledging that there are a large number of excellent books on this subject already in the market, the author considers that none of them quite meets the requirements of the practitioner, in that they are too full of unnecessary details and statistics; for this reason he has therefore limited himself in the main to the more practical side of the subject.

All the tried and most generally useful methods of producing anæsthesia are discussed at length, both as regards the actual administration and the indications for their employment. The subjects of preparation, examination, and after-care of the patient are thoroughly treated in detail, as are also the difficulties and dangers attendant on various operations.

Spinal and local analgesia are passed over in a very cursory fashion—only fourteen pages have been devoted to each subject. We feel that the chapter on spinal analgesia might have been omitted altogether, for it is a large, not to say contentious, subject, and, considering that the satisfactory administration in most cases calls for a comparatively large amount of experience, a practitioner should seldom, if ever, attempt to undertake it.

The final chapter in the book is devoted to the medico-legal position of the anaesthetist, and in these days of perpetual legal actions the advice it contains should be much appreciated.

While the volume contains many valuable practical hints, we would suggest that the chapters on general anaesthesia might with advantage have been more condensed, and certain parts, as for instance the full description of the operations of laryngotomy and tracheotomy, cut out completely.

Actualités Médico-Chirurgicales: Conférences Faites à la Polyclinique H. de Rothschild. By various Authors. Edited by Dr. HENRI DE ROTHSCHILD. Pp. 550. Paris: Octave Doin & Fils. Price 15 fr.

IN the Preface to this large volume we learn that these lectures on some of the more important questions of the day in medicine and surgery were delivered at a hospital which must be almost unique, *i.e.* a general hospital for the poor, with departments for specialities and all modern equipments for X-ray and clinical laboratory work, built and supported by the generosity of a millionaire who is also a medical man. The lecturers, whose names are mentioned on the title-page of the work, are for the most part not on the staff of the hospital. They were asked by Dr. H. de Rothschild to deliver these lectures as representative men, each eminent in his own department. There is thus collected a number of admirable lectures which will no doubt be greatly appreciated in France and in other countries.

Modern Methods of Water Purification. By JOHN DON, F.I.C., A.M.I. Mech.E., and JOHN CHISOLM, A.M.I. Mech.E. Pp. 356. With 96 Illustrations. London: Edward Arnold. 1911. 15s. net.

THE authors of this book have set themselves to give an up-to-date description of the present state of knowledge and practice in the subject of water purification. After taking up the sources of water supplies they give an account of the effects of storage, and then proceed to their main subject of purification. A very thorough description is given of the methods of sand filtration, the latest views

as to the principles underlying the various processes forming here an outstanding feature. The different forms of mechanical filters which have been introduced during recent years are dealt with, and much information is given which it is difficult to find elsewhere, except perhaps in scattered publications. An account of the purification of water by ozone also finds a place in the book, and even the ultra-violet method is referred to. A useful outline is also given of the methods of water-testing, and this includes a number of illustrations of the lower forms of animal and plant life which have to be dealt with by the water engineer.

The outstanding feature of the whole volume is its essentially modern character, the recent scientific work bearing upon the subject being dealt with in an illuminating and at the same time in an original and critical fashion. All the necessary facts are given without the burden of technical detail, and the book will be of the highest value to medical officers of health, to members of local authorities, and to all who are concerned in its subject-matter.

Spirochaetes. By W. CECIL BOSANQUET, M.A., M.D., F.R.C.P. Pp. 152. Fully illustrated. London: W. B. Saunders Co. 1911. Price 12s. net.

IN this volume Dr. Bosanquet has done a distinct service to workers in protozoology and bacteriology by putting forward in a short compass a description of all the forms of spirochaetes which have up to the present been recognised. This is prefaced by a discussion of the general characters of the group which is of value, inasmuch as it puts in a clear way the arguments for and against the spirochaetes being grouped amongst the protozoa. As is well known, since Schaudinn's great work the tendency has been rather to belittle the old view as to their relationship to the bacteria. Coming with the authority of one who has himself worked at the subject, and who manifestly rather leans to the view that the organisms in question are not protozoa, this section of the book forms a definite contribution to the settlement of the question. The volume is furnished with an excellent bibliography, and will be of great use to all workers on the subject.

The Etiology of Beriberi. By HENRY FRASER, M.D., and A. T. STANTON, M.D. Studies from the Institute for Medical Research, Federated Malay States, No. 12. Pp. 89 and 3. Coloured Plates. Singapore: Kelly & Welsh, Ltd. Price 7s.

FOLLOWING on the pioneer work of Eijkman, evidence has been accumulating during recent years pointing to beriberi being due to

the predominance of a rice diet among those suffering from it. Great controversy, however, has arisen as to the precise factor which is responsible for the disease. All attempts to isolate a pathogenic agent either in the form of a living bacterium or fungus or of a poisonous constituent have failed, and the work chronicled by the authors in this book points in an altogether new direction and indicates the true solution of the problem. The rice grain in the East is prepared for consumption in several ways, the essential difference between these being that in certain cases the pericarp is removed from the seed to give the polished rice familiar in this country; the other method is one in which merely the outer husk is removed and the pericarp is left in a more or less unaltered state. Beriberi is found to be associated with the consumption of the polished product. Largely by taking advantage of the fact that polished rice gives rise in fowls to a polyneuritis similar to that occurring in the human disease the authors have shown that the etiological factor is the absence of a substance, probably of the nature of a base, which exists in the pericarp; the removal of this by milling confers on the finished product its noxious quality.

The work, both experimental and chemical, has been carried out in the most careful way, and the results supporting the authors' conclusions are of a very convincing kind. There is in fact very little doubt that they have solved what has been up till now a most perplexing problem, and that the application of these results will lead to the abolition of this serious Oriental scourge.

Apart from the question of the etiology of beriberi, however, the results obtained are of far-reaching importance, for they point to the possibility of the subcortical tissue of various vegetable products used as foods containing substances the importance of which cannot be neglected, an example being found in the pericarp of the wheat, to which so much attention has recently been directed in this country. It is quite evident that a new field of inquiry is being opened up, and the authors are to be congratulated on the importance of the results which they have achieved.

NEW EDITIONS.

Surgical Applied Anatomy. By Sir FREDERICK TREVES and
ARTHUR KEITH. London: Cassell & Co., Ltd.

THIS is the 6th edition and 40th thousand of this text-book. It contains many additions and alterations, the chief of which relate to glands of internal secretion, to the lymphatic system, to the anatomy of the abdomen, and to facts discovered by the use of the X-rays. There are

many illustrations, 58 of which are in colour. The authors have solved a problem in maxima and minima: the book contains the maximum of information in the minimum of space.

A Manual of Bacteriology, Clinical and Applied. By R. TANNER HEWLETT, M.D., F.R.C.P., D.P.H.(Lond.). Fourth Edition. Pp. 685. London: J. & A. Churchill. 1911. Price 10s. 6d.

WE are pleased to see a new edition of this well-known text-book, which for long we have regarded as one of the best manuals of bacteriology in the English language.

In all parts of the book the text has been thoroughly revised and brought up to date.

Amongst the new sections we may mention those on Endotoxins and Anti-endotoxins, on Single-Cell Cultivation (Burri's method), Dark-Ground Illumination, Anaphylaxis, Meistagmin Reaction, Anti-formin, Sporotrichosis, Phlebotomous Fever, Acne, Sour Milk Treatment, and on the Examination of Tissues and Organs for the *Treponema pallidum*.

New facts have been incorporated in the chapters dealing with Tuberculosis (The Royal Commission's Report), the Examination of Milk and of Water, Immunity, Leprosy, Typhoid and Cholera Vaccines, Cultivation of Trypanosomes; and New Tables of Water Analysis have been furnished.

We are interested to note that the author was evidently inclined to believe that recent investigations have proved the correctness of Koch's famous dictum as to the absence of danger to man from bovine tuberculosis. He has, however, added the conclusions of the British Royal Commission, which appeared while his book was passing through the press. These show that this danger cannot be neglected, a conclusion which supports clinical experience—in Edinburgh at least.

There is little to criticise in the volume. We are, nevertheless, inclined to question the author's statements as to diphtheria in cats, and hold that it has never been proved that diphtheria is a natural disease of these animals. The statements to this effect, which with great regularity appear in manuals of bacteriology, rest on some observations of Klein which, so far as we know, have never been verified. No reference is made to the recent work of Bernhardt on scarlet fever; and MacGowan's work on distemper is not mentioned.

We are pleased to see iron-haematoxylin included amongst the stains for the entamoebæ. We have found it most satisfactory for demonstrating that and other related animal parasites. Among the bacterial staining methods, we should have liked to see included that of Richard Muir for capsules, which gives very beautiful results.

Only one or two slips can be detected. On page 108 the statement

appears that Gram's method can be used only with the para-rosanilin dyes, *e.g.* gentian violet, methyl violet, and victoria blue, but on the following page thionine blue is recommended for the same purpose. Other slips are not of sufficient importance to require notice here, except, perhaps, that Westbrook (p. 284) should be Wesbrook.

These minor blemishes do not in the least detract from our admiration of the manner in which Professor Hewlett has carried out the revision of his book. As on former occasions, we recommend this manual with absolute confidence to our readers as a safe guide and as a constant companion, both in the study and in the laboratory.

Tuberculous Disease of the Bones and Joints. By Sir W. WATSON CHEYNE, Bart., F.R.S. Second Edition. Pp. 404. London: Henry Frowde; Hodder & Stoughton. 1911. Price 16s. net.

THIS new edition of Watson Cheyne's well-known work has been thoroughly brought up to date by the addition of new illustrations and by alterations in the text. One of the distinctive features of the work is the detailed account of the pathology of tuberculosis affecting the bones and joints.

It is interesting to note that very little required to be added to the section of pathology which was so thoroughly done in the former edition. The chief changes in the text refer to the details of treatment. Conservative treatment is now given a much more prominent place than formerly.

The illustrations form an excellent series, including micro-photographs, X-Ray photographs, and photographs of clinical cases. The whole subject is so thoroughly and ably discussed that it cannot be too highly recommended to those interested in this part of surgery.

A Text-Book of Physiology. By WILLIAM H. HOWELL, M.D. Fourth Edition. Pp. 1018. London: W. B. Saunders Co. 1911. Price 18s. net.

It is always a great pleasure to find that our old friends are appreciated, and for this reason we are glad to note the fourth edition of this useful text-book. Professor Howell succeeds admirably in the high aim he set before him in his first edition of giving his readers a notion of the "live issues of the day" as well as the "conclusions which have crystallised out of the controversies of other times." New matter and new illustrations have been incorporated, and there is little ground for the author's fear of criticism on the score of errors of omission.

Nor are errors of commission conspicuous. We might, however, point out that in the account of the leucocytes stated to be based on

Ehrlich's classification the author's use of the term "transitional cell" would be repudiated by Ehrlich himself as well as by the authorities quoted as references.

The use of the terms "proteid" and "protein" on page 738 might confuse the junior student. On page 454 the word "fibrin" is obviously intended to read "thrombin." On page 545 there is a wrong reference mark. As a concession to our American cousins we are prepared to forgive "fibers," but surely "microphags" (p. 430) is neither correct nor phonetic. The slight but definite increase in girth which this edition shows prompts the *obiter dictum* that it would be a thousand pities if such a valuable text-book should lose any of its popularity with students by becoming too big.

Clinical Surgery. By C. B. LOCKWOOD, Surgeon to St. Bartholomew's Hospital. Second Edition, enlarged. Pp. 386. London: Henry Frowde; Hodder & Stoughton. 1911. Price 5s. net.

THIS is one of the few books accessible to students and practitioners which treats of surgery from the clinical stand-point. The lectures deal largely with questions of diagnosis, and the subjects are discussed in a frank, colloquial style which is a pleasant relief from the dry narration of facts in most text-books. Of the eighteen chapters some treat of general questions, such as "clinical reasoning," "the recognition and management of intestinal obstruction," "swellings above, below, and within the scrotum," "fæcal leaks and fistulæ," "the wind after abdominal operations," and "clinical pathology in its relation to diagnosis and treatment." Other chapters deal with special conditions, such as varicose veins, dissemination through the lymphatics in cancer of the tongue and of the mamma, salivary calculi, and fracture of the patella.

The author in discussing each subject reasons it out closely, and illustrates his points with frequent reference to cases both successful and unsuccessful. The latter are often the more instructive. His language, although colloquial, is always clear and pointed. The book has been so well received that its first edition was reprinted, and we feel sure that this enlarged edition will be still more highly appreciated. We strongly recommend it alike to teachers, students, and practitioners.

A Treatise on Diagnostic Methods of Examination. By Professor D. H. SAHLI of Bern. Edited with additions by N. B. POTTER, M.D., Assistant Professor of Clinical Medicine, Columbia University, New York. New Second Edition. Pp. 1225, 8vo. Illustrated. Cloth. Price 27s. 6d. net.

THE first edition of the English translation of Professor Sahli's renowned book has been received with a popularity almost surpassing that of the

various German editions. The second edition, recently published, is one of which it would be difficult to speak in terms of excessive praise. One soon learns to realise that this work is not merely a compilation. The major portion of it is derived from the author's own vast experience. While this is a highly valuable feature, the general usefulness of the book is enhanced by the inclusion, usually printed in smaller type, of every well-tryed method of diagnosis.

Sahli's book is already so well known that a detailed review would be a superfluous task. It may justly be regarded as the most important treatise on medical diagnosis in the English language. As to this new English edition, special note may be made of the chapter upon icterus, which has been re-written, the thoroughly revised chapter on cedema, and the new section on the determination of the cutaneous electric resistance in its application to the diagnosis of exophthalmic goitre. The section upon the graphic records of types of respiration in disease is also new.

Dr. C. E. Wolff, Professor of Chemistry in Cornell University Medical School, has edited the purely chemical portion of the text, and Dr. E. G. Zabriskie, Adjunct Professor of Neurology at the Post-Graduate Medical School, has edited the neurological section.

Hygiene and Public Health. By Sir ARTHUR WHITELEGGE, K.C.B., M.D., F.R.C.P., and Sir GEORGE NEWMAN, M.D., D.Ph., F.R.S.E. Twelfth Edition, revised throughout. Illustrated. Pp. 760. London: Cassell & Co., Ltd. 1911.

THE appearance of a twelfth edition of this manual is in itself a clear indication of the favour in which it is held by the student of public health. The authors handle their subject-matter from the point of view of men who have had a thoroughly practical and liberal training in this ever-growing department of medical science, and the information they impart is conveyed with much lucidity. Every department, indeed every branch, of State Medicine finds treatment within the compass of this book, and the authors have been obliged to increase its size by over 100 pages, as compared with the 1908 edition. General sanitation and hygiene, epidemiology, vital statistics, and sanitary law are treated of in a succinct fashion, and there is a good section on the important subject of school hygiene. At the same time it must be kept in mind that where so much is attempted within the compass of a single volume the treatment of certain subjects must be unequal, and in some instances barely adequate. We find, for example, the question of the bleaching of flour disposed of in three lines, although this point has recently been the subject of extended investigations. There is no mention of infective or epidemic poliomyelitis, nor is any reference made under typhus to Nicolle's recent work on the infectivity of this fever. In the case of

yellow fever the view is again enunciated as to a myxo-coccidian parasite being the possible cause of the disease, notwithstanding the fact that the trend of present-day opinion is strongly in favour of an ultra-microscopical infecting agent. Although carriers are discussed in connection with enteric fever and diphtheria they are not mentioned under the subject of cerebro-spinal meningitis. In spite, however, of these minor criticisms, the manual is admirably compiled, and is sure to continue to hold a foremost place among the text-books on the subject. There are 45 illustrations, some of which might with advantage be more distinct.

Manual of Diseases of the Eye. By CHARLES H. MAY, M.D., and CLAUD WORTH, F.R.C.S. Third Edition. Pp. 427. London: Baillière, Tindall & Cox. 1911. Price 10s. 6d. net.

“MAY AND WORTH” is now recognised as one of the best of the text-books upon diseases of the eye intended for the use of students or of practitioners into whose occasional care come cases of ocular troubles. It has now reached its third edition, and is deservedly popular, for its teaching is clear, its mode of setting forth the various conditions is neither scrappy nor redundant, and—a very important fact—its diagrams are plentiful and illustrative. The coloured illustrations are, taken as a whole, very good indeed—as an example, selected almost at random, look at that of scarring of the lid after trachoma, and at that of subconjunctival hæmorrhage; these are nearly perfect. It is true they are not all so good—that of glaucoma (Fig. 169) is a grave blot on the book; no mortal man ever saw an eye like it. Compared, however, as a series with the diagrams on which we used to have to rely they are a great credit to artist, to author, and to publisher. The letterpress is almost uniformly good on diseases, but not so thorough in regard to injuries. In the chapter upon strabismus the personal views of Mr. Worth are, not unnaturally, put forward very prominently, and his not entirely convincing theories are laid down as though there were no possibility of a different opinion.

This edition contains a valuable chapter upon the employment of vaccines, which is novel. On the whole the book is well deserving of its acknowledged popularity.

A Handbook of the Diseases of the Eye and their Treatment. By Sir HENRY R. SWANZY and LOUIS WERNER, Dublin. Tenth Edition, revised. Pp. 634. London: H. K. Lewis. 1912. Price 12s. 6d. net.

WE gladly welcome a new edition of this valuable handbook. In the present edition, as in the previous ones, the endeavour has been to keep

abreast of modern ophthalmology in so far as this is possible in a work of its size, mainly intended for students. The amount of the text is about the same as before, although, in consequence of an alteration in the shape of the book, the number of pages is less. The chapters are differently arranged, with the result that the earlier ones now treat of the normal eye and its functions and the methods of examining them. The book has been thoroughly revised throughout, obsolete matter having been discarded, while new developments have been introduced. For the first time the book now contains coloured figures from original paintings by Mr. Werner, and a most excellent index completes the work. The book all along has taken a very high place in the affection of teachers and students alike, being an up-to-date treatise in reasonable compass on the subject dealt with. We have had the pleasure of reviewing almost all the previous editions, and it is a real pleasure to see that the work is increasingly more valuable with every succeeding edition. We most cordially recommend it to students and practitioners as one of the most reliable works on ophthalmology in the language.

Leitfaden der Elektrodiagnostik und Electrotherapie für Praktiker und Studierende. By Dr. TOBY COHN, Nerve Specialist. Fourth Edition, revised and enlarged. Pp. 212. Berlin: S. Karger. 1912. Price 6s. 6d.

THE fourth edition of Dr. Cohn's book has been brought well up to date, and it contains 71 figures instead of the 31 of the first edition. The account of electro-diagnosis is very complete, alterations in the reactions of the muscles and nerves, including those of the special senses, such as the optic and auditory, are carefully noted. A short account of the electrical resistance of the human body is given, and the method of measuring it by substitution is recommended. Kohlrausch's apparatus with a Wheatstone Bridge is to be preferred. Reference is made to the alterations in resistance found in Basedow's disease and myxœdema. The resistance of the urine and the hæmorenal index are not mentioned. Some account is given of Leduc's method of inducing electric sleep. The plates of the motor points with the underlying nerves are to be highly commended. The book will fill a distinct place in a physician's library.

A Handbook of Physics and Chemistry. By H. E. CORBIN and A. M. STEWART. Fourth Edition. Pp. 519. London: J. & A. Churchill. 1911. Price 7s. 6d. net.

THIS text-book, first issued in 1899, is written to meet the wants of the medical student who is a candidate for the examinations of the

London Conjoint Board. It is concise to a degree, and is, on the whole, accurate in statement. The physical portion of the work is better done than the chemical. What strikes us forcibly in reading the latter section is the small amount of attention paid to matters which might reasonably be expected to interest the medical student. For example, in Chapter XIII. no mention is made of any medical use of zinc or its compounds; and even in the case of mercury we merely find the statement that corrosive sublimate is extremely poisonous. Again, in Chapter XV. no reference whatever is made to the use of any compound of arsenic, antimony, or bismuth as a drug. It is no compensation for such omissions to include, as is done, a page on the preparation and properties of elementary boron, which not one chemist in a hundred has ever seen, and not one in a thousand ever handled. A better selection of material and more judicious treatment, from the medical point of view, would greatly increase the utility of the volume and relieve it of the charge, to which it is at present more or less open, of being a cram-book. The type of the book is excellent, but some of the figures are far from clear, *e.g.* those on page 180 illustrating the connection of voltaic cells in series and in parallel.

NOTES ON BOOKS.

DR. J. F. COLYER'S *Dental Disease in its Relation to General Medicine* (Longmans, Green & Co.) is largely a reprint of those parts of the author's well-known text-book on Dental Surgery and Pathology which are of special interest to the general medical practitioner. It commences with a chapter on dentition, then the conditions that influence the growth of the jaws are discussed, and this is followed by a comprehensive account of dental caries. We would particularly draw the attention of the family doctor to the author's conviction, shared by most dental surgeons who have studied the subject, that dental caries can now be regarded as a preventible disease.

After giving a full and rational account of diseases of the periodontal membrane and oral sepsis, the author passes to the consideration of reflex affections arising from diseases of the teeth and the treatment of dental disease in children. The book closes with a suggestive chapter on dental disease in relationship to life insurance—a subject that will undoubtedly assume greater importance in the near future. The book, which is well illustrated and written in a clear, terse style, worthily supplies a long-felt want in medical literature.

Bone-Setting and the Treatment of Painful Joints, by Frank Romer, M.R.C.S., L.R.C.P., and L. Eliot Creasy, M.R.C.S., L.R.C.P. (James

Nisbet & Co., Ltd.). The present is an opportune time to publish a book on bone-setting, and the authors have done well in seizing the opportunity. The simplicity of the art of bone-setting is displayed. There is nothing new described, but much that is common knowledge is gathered together and set down in orderly fashion and in simple language. The necessity for so-called "bone-setting" will disappear as the application of immediate massage and movement in all cases of injured joints becomes more general. Until then this book will serve a useful purpose in describing the best line of treatment for after-stiffness in joints, following injury.

St. Thomas's Hospital Reports for 1909, Vol. XXXVIII. This volume contains the reports of the various departments of the hospital—medical, surgical, gynæcological, and eight others—together with a list of recent additions to the pathological museum. The cases are all duly classified and recorded, and are thus easily referred to. It is a record of work which will serve as a valuable reference for the various branches of medical science.

The *St. Luke's Hospital Medical and Surgical Reports*, Vol. II. 1910, published by Howard of Poughkeepsie, New York, contain much valuable and interesting matter. End-to-end intestinal anastomosis by the invagination method, ileo-colic intussusception with resection of 22 inches of gangrenous gut, recovery—both beautifully illustrated, resection of spinal nerve roots, cystoscopy as an aid to diagnosis, experiences with Ehrlich's 606, treatment of infantile paralysis, phagocytosis of the red blood cells after transfusion—well illustrated, anticomplementary bodies in serum, and a new telephonic searcher of metallic foreign bodies in the tissues, are among the contributions, and there are several others. The volume contains in 253 pages the record of much interesting work.

In *Explosions et explosifs: phénomènes d'explosion*, Professor Piozzi-Escott of Lima, Peru, deals in 85 pages with various explosives. After a chapter on chemical dynamics he proceeds to discuss ordinary black gunpowder, smokeless powders, nitroglycerine, dynamite, and other explosives. He gives the comparative strength of some of those thus: Black gunpowder 3193, Nitroglycerine 10081, Dynamite-gomme 10275, Explosif Favier 18145, $H_2 + O$ 18145.

It is not often that one can recommend a small manual that had been admittedly written for students and junior practitioners; it is therefore a pleasure to be able to express our appreciation of Mr. H. Edmund G. Boyle's *Practical Anaesthetics* (Oxford Medical Manuals, 2nd edition, 5s. net.), in which the cardinal principles that should

govern the administration of anæsthetics are clearly set forth. On the whole the book is thoroughly sound, but the experience of a specialist may lead him to question the propriety of some of the advice. For example, the drawbacks and dangers of ethyl chloride narcosis, to which the author refers more than once, are due far more to the somewhat crude apparatus and method of administration adopted than to the drug itself.

There is a chapter on spinal analgesia, and very properly only the everyday methods of administering the common anæsthetics are discussed. The printing and illustrations are all that could be desired.

Dr. O'Reilly, in his preface to *A Manual of Physical Diagnosis* (J. & A. Churchill, 8s. 6d. net), declares that his purpose in writing this book is to present an epitome of the various physical methods employed in the diagnosis of a medical case, and at the same time frankly admits that "the volume is a compilation from the work of others."

If the book is a compilation it is a compact one, which is much better than a diffuse one. But to contract so large a subject as the means of diagnosis in medicine into small compass and yet to retain a clear presentation is a task of great difficulty. We are not sure that the author has entirely succeeded. His best chapters are certainly those on the fundamental subjects of the circulatory and respiratory systems. These are dealt with accurately and completely, and even radioscopic methods in pulmonary diagnosis and the pulse-recording methods of Mackenzie are described. But even here, and more apparently in the other chapters, one receives the impression that the writer, in attempting to give a little of everything, has disposed of essential principles and foundations with dangerous brevity. Comment, too, must be made of the paucity of illustrations. The very important subject of the nervous system is not assisted by a single diagram.

The fact that the present is the 6th edition of *Gould's Pocket Medical Dictionary* (H. K. Lewis, 5s. net) is sufficient testimony to the popularity it has attained. In every respect the present volume, which contains 4500 more words than its predecessor, achieves the aim of the author to produce "a small elementary word book that may be slipped into the pocket for hurried reference and to serve as a passing reminder of the essential meaning of the more commonly used terms." Like a carriage clock, while neither weighty nor pretentious, it is accurate and convenient. The flexible leather covers, the thin paper, the clear type, all serve to fit the book to its special purpose. It is indeed something more than a lexicon, for in the addition of tables of bacteria, arteries, muscles and nerves, doses, etc., it aspires to be a small compendium of medical knowledge.

The present volume of *The Transactions of the College of Physicians of Philadelphia* (Vol. XXXII.) contains the papers read to the College during 1910. All that need be said is that a high level of practical interest and scientific merit is maintained. Dr. Joseph Sailer contributes an interesting paper on "Chronic Pancreatitis." This is followed by a very careful examination of the Cammidge reaction, in which the authors conclude that "it is a mistake to interpret every positive Cammidge reaction as indicative of organic disease of the pancreas, but that a positive reaction indicates a disturbed pancreatic function." The remaining papers deal with a wide range of subjects, and in all cases the value of the different papers is enhanced by inclusion of discussions.

The first and second volumes of *International Clinics* (1911) (J. B. Lippincott Company) maintain the standard of previous numbers in the excellence, variety, and interest of the contents. Even to enumerate the subjects dealt with would far trespass the allotted limits of space; but it is enough to indicate that in medicine, surgery, obstetrics and gynecology, and all the recognised special branches, papers of genuine authority and value will be found. One comment, not in the nature of criticism, may be made. It is a little unfortunate that in these volumes of a publication which is professedly international only two contributions are made by European authors. That may not be the fault of the editors, and it certainly should not detract from the intrinsic value of the contents, but it would be a pity if the international character of this quarterly, strongly in evidence on the title-page, were to become practically submerged.

Dr. Fordyce's book on *The Care of Infants and Young Children* (E. & S. Livingstone, 1s. 6d. net) has grown from a course of lectures delivered to a class at the Christian Workers' Training Institute in Edinburgh, and in its present form is intended for "mothers, nurses, health visitors, and students of medicine." The admirable purpose of the volume is to diffuse more widely the elementary principles of health and hygiene in infants and young children. This is a sphere in which preventive medicine has as yet found too small a scope, but in which it has immense opportunities. In this work of education the present book is admirably fitted to play a notable part. Dr. Fordyce has the gift of a clear and interesting style, and in dealing with the characteristics of health and of disease in infancy, with diet and hygiene, with digestive disorders and the common infective diseases in childhood, he writes not only with expert knowledge but with lucidity, emphasis, and graphic vividness. The volume is further enhanced in value by a series of admirable illustrations.

BOOKS RECEIVED.

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|---|--|------------------------------|-------------------|
| AARON, C. D. | Diseases of the Stomach | (Churchill) | 21s. |
| ANDERS, J. M. | Practice of Medicine | (W. B. Saunders Co.) | 5 dols. 50 cents. |
| BARNETT, K. B. | Handbook on Military Sanitation for Regimental Officers | | |
| | | (Forster, Groom & Co.) | 2s. 6d. |
| BEARD, J. | The Enzyme Treatment of Cancer | (Chatto & Windus) | — |
| BERKART, J. B. | On Bronchial Asthma. Third Edition | (Frowde, Hodder & Stoughton) | 5s. |
| CHURCH, A., and F. PATERSON. | Nervous and Mental Diseases. Seventh Edition | | |
| | | (W. B. Saunders Co.) | — |
| COREIL and DEVILLE. | Traité de Desinfection | (Roussel, Paris) | 16 fr. |
| DAVIS, E. P. | Operative Obstetrics | (W. B. Saunders Co.) | — |
| DELAFIELD and PRUDDEN. | Text-book of Pathology. Ninth Edition | | |
| | | (Baillière, Tindall & Cox) | 25s. |
| FISCHER, M. H. | Nephritis | (Wiley & Sons, New York) | 2 dols. 50 cents. |
| GARRY, T. G. | Some Factors Influencing Health in Tropical and Sub-Tropical Countries | | |
| | | (Bale & Danielsson) | 2s. 6d. |
| GRIFFITHS, F. G. | Studies on Pulmonary Tuberculosis | (Baillière, Tindall & Cox) | 5s. |
| IRVINE, G. N. | In the Valley of Vision | (Simpkin, Marshall & Kent) | 2s. 6d. |
| MARSHALL, C. E. | Microbiology | (Churchill) | 10s. 6d. |
| MORGAN, C. G. | Alphabet of the Insurance Act. | (Methuen & Co.) | 1s. |
| MORTON, J. N. | The Law Relating to Medical Practitioners and Dentists; | (Green & Sons) | 7s. 6d. |
| NOTES on Modern Diagnostic Methods | | (Fellows Co.) | — |
| PRESCRIBER, The. | Vol. V., 1911 | | — |
| PROCEEDINGS of the Royal Society of Medicine. | Vol. V., No. 2 | (Longmans, Green & Co.) | 7s. 6d. |
| SYSTEM of Surgery. | Vol. I., Surgical Pathology, Tumours, etc. Edited by C. C. Choyce | | |
| | | (Cassell & Co.) | 21s. |
| TIDSWELL, H. H. | The Tobacco Habit | (Churchill) | 3s. 6d. |
| VEGETARIAN Cookery | | (H. J. Glaisher) | 1s. 6d. |
| WARWICK and TUNSTALL. | First Aid to the Injured and Sick | (John Wright & Co.) | 1s. |
| WELLCOME Laboratories. | Supplement to Fourth Report | (Baillière, Tindall & Cox) | 15s. |

EDINBURGH MEDICAL JOURNAL.

Joseph, Baron Lister

Born at Upton, Essex, 5th April 1827

Died at Walmer, Kent, 10th February 1912

ἰητρὸς γὰρ ἀνὴρ πολλῶν ἀντάξιός ἄλλων
λοῖός τ' ἐκτάμνειν ἐπὶ τ' ἥπια φάρμακα πάσσειν.

ILIAD, xi.

*"A wise physician, skill'd our wounds to heal,
Is more than armies to the public weal."*

POPE'S TRANSLATION.

EDITORIAL NOTES.

**National Insurance and
the Representative
Meeting.**

THE tactics of the supporters of the National Insurance Act towards the opposition of the medical profession have passed through several phases. At first we were told, with tedious iteration, that our fears were based on misapprehensions; that we stood to gain, not lose; that, in short, we understood neither the Act nor our own business. Mingled with these admonitions were pious hopes that our known philanthropy would lead us, as good citizens, to assist the State in caring for its units—as soon, at least, as our childish fears for our own fate were lulled. Exhortation and admonition having failed, a sterner attitude was adopted. The doctors' opposition was factious; the agitation was manufactured, and did not represent the real feeling of the rank and file, who were being lured on for political reasons by "impulsive, indiscreet, and ill-informed men," and exploited by self-constituted leaders inspired by enmity to the British Medical Association and all its doings. Censure having been as little effectual as pleading, there remained only menace and bluster, and Mr. Lloyd George, in one of those speeches which extend his fame as a demagogue more than his reputation as a statesman, threatened that if we did not come to terms the very evils we most fear would be our fate.

The astonishing feature in all this campaign has been its misdirection. No serious attempt apparently has been made to get at facts, either as to what we require, or whether we are in earnest. It is conceivable that we do not thoroughly understand all the provisions of a most complicated statute, nor foresee all its results; it is absolutely certain that our critics, from Mr. Lloyd George down, have given public evidence of an entire failure, so ludicrous that it is difficult to believe it unintentional, to grasp the position of the medical profession. That medical opposition is political, that it is inspired by "Harley Street" and the Royal Corporations, that the general practitioners who form the bulk of the British Medical Association are willing to compromise, are assumptions in which there is not a grain of truth. In the interests of the public welfare it is really desirable that those who are responsible for the Insurance Act should discard rhetoric fervour and descend to a common-place grapple with facts. Let them, even at this late date, apply their minds seriously to considering the demands of the profession. There is the more need for this now that the special representative meeting has been held. The deliverances of the most popularly constituted of our professional organisations afford the authorities an opportunity of doing this which they can no longer overlook.

With these deliverances every member of the profession is in substantial agreement. The net result of the meeting is unquestionably to stiffen the back of the Council, to force it to take up an unyielding position, and to bring it into line with other medical bodies. The motions calling for Dr. Maclean's resignation and of lack of confidence in the Council were lost, a result which seems to have been partly due to a general desire to let bygones be bygones, and also to the moderation of the Manchester critics, who wisely preferred conciliation and compromise to the risk of protracted dissension or the appearance of a split. The most important issue of the meeting was the election of the State Sickness Insurance Committee. This committee is very directly representative of the profession, and will apparently in a large measure supersede the Council in considering the questions raised by the Insurance Act. The meeting, moreover, very definitely instructed the Council to inform the Insurance Commissioners "in plain and unmistakable language" that unless the minimum demands of the Association are embodied in the Regulations issued by the Commissioners, the Association will call on its members to decline to undertake medical duties under the Act. The question of remuneration was another of many points discussed at the meeting, and 8s. 6d. was fixed as the minimum capitation fee. This is less than the Edinburgh representatives asked for, but the compromise appeared desirable in view of the conditions existing in various parts of the country. On the whole, then, there is no reason to be disappointed with the outcome of the meeting. The Association is at last deliberately committed to a fixed policy which admits of no wavering. It is proved to demonstration that hostility to the Act is not peculiar to any one section of the profession; that club doctors, private practitioners, and specialists are equally determined; that the democratic British Medical Association and the non-democratic Corporations are on common ground, and can join hands in opposing the measure.

Mr. Lloyd George is the mainstay of his party, but many of his acts and speeches must be reckoned among the assets of his opponents. Threats such as his frighten more waverers into our ranks than out of them. That suspension of the medical benefits would have the effect he anticipates we do not believe, so much has the spirit of union grown among us and the organisation of the profession improved. But suppose that it did in fact lead to a great increase of contract practice on the present conditions, or on worse conditions; suppose that medical men are, actually, "enticed to their own destruction"—What then? Will the Act succeed? No, because a community living under the conditions of modern civilisation must have good doctors or perish. A measure is predestined to fail which extends and perpetuates all the worst features of the present system. If Mr. Lloyd George only knew these as we know them, he could not (as he does) have con-

templated such a contingency with levity. To give the people ninepence for fourpence may be a financial possibility : it is a medical impossibility to sustain or improve the health of the nation by damaging and impairing the efficiency of those who alone know how to better it.

THE Scottish members of this Committee elected
State Sickness Insurance
Committee of the B.M.A. by the Representatives are as follows:—Aberdeen, Northern Counties, Dundee and Perth, Edinburgh and Fife—Dr. J. Munro Moir and Dr. R. M'Kenzie Johnston. Glasgow and West of Scotland, Border Counties and Stirling—Dr. Bruce Goff and Dr. J. Adams.

Hutchinson's "Archives
of Surgery." THE issue of the last number of Sir Jonathan Hutchinson's *Archives of Surgery* brings to a conclusion a notable personal contribution to the literature of surgery.

The author's unique gifts as a clinical observer, his extended opportunities of obtaining material and experience, and his indomitable perseverance and industry have enabled him in the eleven volumes of which the work is composed to bequeath to the profession a veritable storehouse of information on the multifarious matters in which he has specially interested himself. How wide and catholic were his interests may be gathered from a glance at the collated index of the whole series which is appended to the last number. Even had Sir Jonathan done nothing more for surgery than is embodied in his *Archives*, he would have earned the admiration and gratitude of his profession. We offer him our hearty congratulations on the completion of his invaluable work, which will ever stand as a monument to his name.

NUMAN, THE VETERINARIAN AND COMPARATIVE ANATOMIST OF UTRECHT: A FORGOTTEN OBSERVER ON THE FREE-MARTIN.

By D. BERRY HART, M.D., &c.,
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IN 1910, when investigating the question of the free-martin, I came on a reference in Geddes and Thomson's *Evolution of Sex** to Spiegelberg's opinion that in the free-martin "the internal organs are male but the external accessory organs are female, and there are also rudimentary female ducts." Through the courtesy of Professor J. Arthur Thomson of Aberdeen I obtained the name of the now extinct journal in which Spiegelberg's paper† was published. This proved to be an exceedingly important communication, as Spiegelberg showed for the first time that the sexual gland in the free-martin calf was a testis, and also gave a completely satisfactory description of the other rudimentary organs present. He quoted in addition from a Dutch monograph by Numan of Utrecht, translated into French by Professor Verheyen of Brussels in the *Journal vétérinaire et agricole de Belgique* for 1844.‡ This, however, gave the text and references to the plates only, but not the plates themselves. In a note it is stated, "Ce mémoire est accompagné de 23 planches: nous avons conservé tous les renvois aux planches dans la traduction, après nous être assuré que l'éditeur les fournirait indépendamment du texte hollandais." It was necessary, therefore, to get at the original Dutch monograph, and finally by advertisement a very fine quite new and uncut copy was obtained.§ It was now evident why the plates were not supplied to the Belgian journal, as the former are large quarto lithographs and the latter a folio journal, thus rendering their publication a matter of difficulty.

* Geddes and J. A. Thomson, *Evolution of Sex*, 1st edit. p. 39, Walter Scott, London, 1889.

† O. Spiegelberg, "Ueber die Verkümmern der Genitalien bei angeblich verschieden geschlechtlichen Zwillings-Kälbern," *Zeitschr. für rationelle Medicin*, Henle & Pfeufer, Drt. Reihe., Bd. xi., 1861.

‡ Dr. A. Numan, "Mémoire sur les vaches stériles, connues sous le nom d'hermaphrodites, comparées à d'autres animaux portant des vices de conformation de l'appareil sexuel," traduit du Hollandais par S. Verheyen.

§ Both the *Journal vétérinaire de Belgique* and Numan's monograph are now in the library of the Royal College of Physicians, Edinburgh.

Before going on now to summarise and describe Numan's monograph I wish to give a few facts as to Numan's career, which I obtained from Professor van den Broek of Utrecht, a distinguished anatomist and comparative anatomist.

His letter is to the following effect:—

“UTRECHT, 1910.

“DEAR DR. BERRY HART.—A few days ago I met someone who could tell me something about the life of Numan; herewith I give you the information I obtained from him.

“Alexander Numan was born at Baflo, 8th December 1780; studied medicine at the University of Groningen, and took his degree as Doctor of Medicine, 14th August 1804; settled then as physician in Hougezand, a little place in the neighbourhood of Groningen. He founded with Dr. Lidth de Jeude the veterinary school in Utrecht in 1821. On 26th September he opened his lectures. On 8th July 1824 he became Director of the Veterinary School. He then held lectures on hygiene, general pathology, therapeutics, judicial veterinary art. Each morning he had to give a clinical lecture, assisted by a veterinarian who taught, under his guidance, obstetrics and surgery. On 1st March 1851 he was succeeded by Dr. Wellenbergh. He died 1st September 1852.

“He wrote, as was said to me, a very great many papers on the most different subjects of his science; if necessary I can provide you with a list of his most important papers.

“I hope that this information will be of interest to you. I regret the delay in answering your kind letter of September.

“A. J. v. d. BROEK.”

Numan was evidently a man of great ability and energy. His founding of the Utrecht Veterinary School, the many subjects he taught, and the advanced age he reached, still teaching, are proofs of exceptional mental and bodily vigour. This is also shown by the present monograph which I now go on to summarise,* taking the French translation for this purpose, with a glance at the Dutch original occasionally so far as braid Scots and German can carry one.

THE TEXT.

“In some general introductory remarks Numan points out the apparent predisposition of the calf to deformities. Thus the sides may be folded back in an inverted way and the whole body turned over so that the vertebral bodies are

* This account is in no sense a translation but a free summary.

placed above and the spines directed downwards, with the abdominal and pleural cavities still unclosed. Deformities of the head are common,* and the same applies to sheep. Polydactyly is also more frequent in pigs than in other species, and the limbs may acquire an apparent resemblance to the hand of man.

“The cow presents, however, a special deformity in regard to the genital organs, with sterility as a result, the animals having the appearance of oxen, and being termed *kween* in Holland and *bouquetin* in Brabant, *i.e.* hermaphrodites. The term *bouquetin* is also applied to hens taking on the characteristics of cocks. The anomalous animals called *kween* are named *free-martins* in England. As Simpson pointed out and Numan emphasises, this condition was known to the Romans under the term *taura*, as well as in modern times in Normandy; in France (known as *taur*), and as already said, in England (free-martin); in Germany as *Zwitter*.†

“The uncertainty attending such genital deformities prompted the Society of Arts and Sciences of Utrecht to propose, in 1833, a competitive research *a propos* of the belief among agriculturists that when a cow has twin calves, one a male, the other a female, the latter, which is termed a hermaphrodite, is incapable of impregnation. The following were the queries laid down:—*Quelle valeur possède cette observation des éleveurs? Est-elle suffisamment fondée, peut-on l'admettre comme une loi de Nature? En quoi diffèrent les vaches hermaphrodites de celles qui ne le sont pas, quant à leur conformation extérieure et intérieure? Quelle différence remarque-t-on dans l'habitude extérieure, entre les vaches hermaphrodites et celles que l'on a rendues stériles par la castration? Les vaches*

* See Gurlt's *Atlas*, pt. iii., for agnathous lamb.

† The origin of the term “free-martin” is obscure. The most probable explanation seems to me to be as follows:—*Farrow*=sterile in Scots and north of England dialects. *Mart* was the cow or ox killed and salted at Martinmas for use during winter. For this purpose a cow that had missed calving or a heifer that was sterile and differed from an ordinary heifer, as the free-martin does, would be selected, as a fertile cow would be kept for breeding. The selected apparent heifer might then be termed the “Farrow-mart-one,” or in Scots the “Farrow-mart-yin,” and this might be corrupted or shortened into “free-martin” see Wright's *English Dialect Dictionary* and J. W. Ballantyne in the *Brit. Med. Journ.*, 7th May 1910, article, “The History and Etymology of the Free-Martin,” p. 1125).

hermaphrodites présentent-elles aussi entre elles quelques différences apercevables; dans l'affirmative, en quoi consistent les différences? Y a-t-il des causes auxquelles on doive attribuer ce singulier phénomène, et le rencontre-t-on encore chez d'autres espèces animales?

"No response was made to this well-stated series of queries, and therefore Numan began his investigation, publishing it in 1843, without, however, for personal and other reasons, sending it in to the Society.

"He discusses the whole subject as follows:—

"(1) Quelle valeur possède cette observation des éleveurs?

"(2) Est-elle suffisamment fondée, peut on l'admettre comme certaine, infaillible, comme un loi de la Nature?

"(1) *What value does this observation of stock-raisers possess?*

"(2) *Is it sufficiently established? Can one admit it as certain, infaillible, as a law of Nature?*

"These two questions are one, and can be treated conjointly.

"The agriculturist constantly in touch with cattle is necessarily much struck with cases of twins where one is a male and the other an apparent female, and that the latter is sterile and partakes of male characteristics. The questions arising from this will be discussed by them sooner than by naturalists. Eminent naturalists have doubted the agriculturists' opinions on this subject, and others have rejected it. Camper declared the belief that the co-twin apparent female is sterile, a ridiculous absurdity; Blumenbach also doubted it on insufficient grounds; other authors—Scarpa, Smellie, Hunter, and Meckel—admit the opinion as one based on experience. The last author thinks that if this rule has exceptions his researches tend in the majority of cases to confirm the opinion of Hunter and Scarpa. If a long succession of facts from time immemorial has established that this fault of sterility is attached to the apparent female co-twin one asks, Is the phenomenon constant? Does the female always show anomalies? Are they among the immutable laws of Nature? In countries rich in cattle, for instance in the province of Groningen, the stock-raisers consider the condition as constant, and in a prize memoir '*Sur les qualités du bétail*' G. Reinders, an able scientific agriculturist, says: 'Il paraît étrange, et cependant l'expérience le confirme, lorsqu'une vache porte deux fœtus, dont un mâle et une femelle,

cette dernière par la suite est ordinairement une vache stérile.' Some observers whose testimony is trustworthy have assured me that there is no case to the contrary. Other stock-raisers at Utrecht agree with the above, but state that the rule has numerous exceptions. Thus M. G. Reinders communicated to me that the co-twin apparent female may not be a hermaphrodite, and M. Bouman has seen three cases where conception took place. Observations in Germany, England, and France accord with these remarks. Hunter thinks that the twins of different sexes can have the genital organs well formed. Meckel does not admit that the sterility of the female is universal, and Blumenbach reports a case of conception. Earl Spencer stated that he had frequently heard it said by agriculturists that a heifer born with a bull was capable of procreation, but that he had never seen an example of this. Schaeven, a veterinarian at Erkelenz, announced some facts known to him quite contrary to the view of sterility. Buchan of Killingtringham (*sic*) gave in the farmers' magazine for 1806 an account of a hermaphrodite cow which had a calf. The same proprietor had another which was sterile. An anonymous writer in 1807 gives an account of a cow which in November 1804 had two calves, one a male, the other a female. In the spring of 1807 the latter gave birth to a male calf, and at the same time a neighbouring proprietor had a heifer arising from a twin labour with different sexes, and the heifer in its fourth or fifth year 'n'avait jamais souffert les approches du taureau.'* Youatt, who reports these facts, remarks that it is a rare exception and a deviation in the natural history of bovine animals to see a similar (*semblable*) cow have calves, seeing that one should consider it as a hermaphrodite: it is apt for procreation when the generative organs are not bisexual, or where the female apparatus predominates. For the moment I do not consider this remark, but return to it when discussing hermaphroditism.

"For several years I had made observations on this subject, and these have confirmed me in the opinion of those who admit that the exceptions mentioned are not very common, but nevertheless do exist. I shall give only one example. I received in 1829 at the Veterinary School two

* As we shall see, if a male and female twin calf are fertile they arise from separate fertilised ova, and the female is not a free-martin.

calves of one birth (*d'une même mise-bas*), a male and a female. The latter was reserved for experimental trial. There was no difference between its conformation and that of another animal. In its second year 'l'orgasme vénérien s'éveilla; elle fut accouplée le 31 Janvier 1831 et donna un veau le 29 Octobre suivant.' This cow, being a good milker, was bred from and had several calves. Quite a number of such cases are known, but it would take up too much space to recount them. These examples appeared to me sufficient to demonstrate that sterility is not irrevocably bound up with varying organs in a male and female calf, and that one cannot consider it, under these circumstances, as a general law of Nature.* ('Ces exemples me paraissent suffisants pour démontrer que la stérilité n'est pas irrévocablement liée aux parts doubles d'un veau mâle et d'un veau femelle, et qu'on ne peut la considérer dans cette circonstance, comme une loi générale de la Nature.')

"The preceding observations raise the uncertainties which still exist on this question, but there is a second one at present as follows:—Is sterility in a cow depending on a maldevelopment of the organs only present in twins of different sexes or when the twins are of the same sex? The first is a case of sterility of the cow, but as to the second some German writers speak of hermaphroditism of the cow in twin births without specifying the sex. The want of direct observations hinder me from settling the question, nevertheless the following facts warrant me to suppose that in the double organs of two females there may be a hermaphroditic condition:—

"On the 3rd April 1834 I saw with M. Beukhout, an agriculturist of Maarssen, a female twin. The female co-twin had been sold shortly after birth on account of her small size. This animal was about 2 years old. She resembled the ox in external conformation. The horns were wide apart (*écartées*), and longer and finer than is wont. The head was straight and more elongated than in an ordinary cow. The vulva was narrow, so that it was scarcely possible to introduce a finger; the vulvar labia were small and atrophied. The *bouquet de poils* and the clitoris were not well developed. In the mammary region there were four little teats of the same

* It may be mentioned here in advance that such cases arise from separate fertilised ova. The free-martin and potent twin arise from one.

size as one meets in the bull. There was no trace of an udder, at least what one regards as such, and the skin, usually a little abundant in that region, was lax and pendent like a sac. Not having been able, to my great regret, to examine the internal generative organs after death, I am in uncertainty as to their formation. If it is certain that I was not deceived as to the sex of the sister co-twin, and the owner has given me formal assurance on this point, one can admit that we may have double parts in two female calves in place of the incomplete development which characterises hermaphroditism.

“One still holds that when the twins are males neither is impotent. Experience has shown me that this rule is not without exception.

“In 1832 M. van der Vaart had at Maarssen a cow arrived nearly at term. As she was unable to rise owing to feebleness of the back, it was thought she could not undergo parturition; otherwise she was sound. The owner determined to deliver by abdominal hysterotomy (*par l'hystérotomie abdominale*) and to slaughter her immediately afterwards. Two male calves were obtained. The one was castrated by complete section of the scrotum at the abdomen, the procedure (*que l'on appelle raser*) practised by agriculturists, who state that this operation carried out at the right time and in this way gives to the ox a more delicate flesh and fine and long horns. The second calf was considered impotent, and was bought by me in March of the following year. It was in a miserable condition and had the following characteristics:—It was piebald (*pie baiv*). A little below the anus in the perineum one could see a small opening for the escape of urine. There was hypospadias, and the urethra was easily felt at the edge of the ischial arch. It opened externally about two handsbreadth below the anus in a fissure of the skin, the glans being imperforate; this cleft presented in some sort the aspect of a vulva bounded by its two labia; it was provided inferiorly with a voluminous tuft of hair (*haarlok* in Dutch). On 10th June the animal was again examined, and the testicles were felt very distinctly in the groins, and where one should have the scrotum, which did not exist, there were four little nipples. Instead of the phallus there was an imperforate dilatation of skin without

the hairtuft which surmounts the prepuce in the bovine species. Both animals ultimately grew well.

"On post mortem of this supposed hermaphrodite female the organs were found as in Plate XI.* This animal appears, therefore, to be a hermaphrodite, to which the term 'taure' is given. According to my results such animals should be looked on (*envisagées*) as veritable bulls whose generative apparatus, internal and external, is more or less incompletely developed; this gives an appearance of deformity and a certain resemblance to hermaphroditism.

"Numan gives other cases, but as he did not recognise that those of his cases that were similar to John Hunter's were defective males, and also imported into the question the idea of hermaphroditism, it would only introduce confusion to give them, and I therefore pass them over."

I now give Numan's conclusions on this point, with explanatory remarks:—

"1. Lorsque une vache met bas deux veaux, l'un mâle, l'autre femelle, cette dernière a presque toujours les organes de génération mal conformés ou incomplets et elle est frappée de stérilité.

"The real statement should be that both are males, the one normal, the other with a small undescended testis, and the epoophoron of its normal co-twin given to it (see paper † on 'Free-Martin' by the author). This is the ordinary free-martin, and has no rudimentary prepuce.

"2. Ce fait fondé sur l'expérience des cultivateurs, confirmé par des observations anciennes et modernes, comporte pourtant des exceptions qui ne permettent pas de le considérer comme une loi fixe de la Nature.

"These exceptions are where the twins, male and female, arise from separate zygotes. As we shall see, the potent twin (male) and free-martin are from one zygote:

"3. L'anomalie ne se borne pas exclusivement aux gestations doubles de fœtus à sexes différents; elle peut aussi se présenter, quoique plus rarement chez les jumeaux de même sexe.

* In Numan's *Atlas*. It is a case of undescended testes. The external genitals are feminine, but might be considered hypospadiac. It is not a stierkween as Numan figures it.

† *Proceedings of the Royal Society of Edinburgh*, 1910-11.

"This is in the case of Numan's *Stiermartin*, also a free-martin, where he recognised the sexual glands as testes.

"4. Le vice de conformation dans les parts doubles à sexes dissemblables, n'est pas exclusif à la femelle; le mâle en présente aussi des exemples et alors la femelle est régulièrement conformée: seulement les faits de ce genre sont rares."

By this he means that Hunter's free-martin is a female and the *Stiermartin* a male. The former is wrong, the latter right. Another most interesting question is as follows:—Can we have a normal female and a female deformed in its genitals in twins of one zygote? I certainly hold theoretically that we may have a normal female and a deformed female with part of the vagina (lowest $\frac{1}{2}$) and the epoophoron, the non-potent male element of the female, segregated into it. One such case is quoted by Numan, but the record is imperfect.

"5. Les gestations doubles ou multiples peuvent être considérées dans l'espèce bovine comme la principale, et quant au veau femelle, comme la condition la plus certain et la plus constante d'hermaphrodisme; d'autant plus que l'anomalie des organes génitaux, cause de la stérilité, n'a pas encore, à ma connaissance, été observée parmi les veaux femelles, provenant d'une gestation simple. On rencontre plus souvent l'appareil sexuel incomplet chez l'individu mâle, qui se trouve dans le même cas, raison pour laquelle il mérite, d'être placé au nombre des hermaphrodites."

The first part of this conclusion is right as to the frequency of twins in cattle, but wrong in considering the free-martin as a hermaphrodite, which it is not. The second part of the conclusion as to the frequency of the male single at a birth having apparent hermaphroditism as compared with the single females is striking, and indeed I consider a so-called pseudo-hermaphrodite as usually a maldeveloped male. This is to be judged by the sexual gland, of course, and not by the apparent female portion of the lower tract, which is really the hydatid testis and prostatic utricle.

We now pass on to another head.

"3. En quoi différent les vaches hermaphrodites de celles qui ne le sont pas, quant à leur conformation extérieure et intérieure.

"Numan gives an excellent description of the free-

martin, or, as he terms it, hermaphrodite (Plate I., 1 and 2). There is greater growth of the horns, greater length, but they are proportionally thinner, straighter, pass up and back, and are like those of the ox. As in the ox, the circular ridges showing the age of the animal are less distinct. They have the head gaunter, slightly elongated, etc. The body may be large, both broader and higher. The bones are smaller, and the animals stand higher on their limbs.

"The vulva is narrow and the labia finer and shorter; the vagina appears contracted, the clitoris usually more voluminous. The udder is little developed, and often merely a wrinkled and folded dilatation of the skin. In some the skin there hangs as a voluminous pouch, like a real mamma, or may be so little marked that no mammæ appear to be present. One finds, nevertheless, the number of teats proper to the cow—four to six.

"The consideration of the internal organs is postponed until the organic causes determining hermaphroditism are taken up.

"Numan gives some interesting facts as to the results of spaying in cows, and compares the results with the conditions in Hunter's free-martins on the supposition that these are females. Such spayed cows attain enormous weight, and the operation in vogue, chiefly in the province of Groningen, gives, it is said, an animal fat and with tender flesh.

"4. Quelle différence remarque-t-on dans l'habitude extérieure, entre les vaches hermaphrodites et celles que l'on a rendues stériles par la castration ?

"5. Les vaches hermaphrodites présentent-elles aussi quelques différences apercevables : dans l'affirmative, en quoi consistent ces différences ?"

Numan discusses in the first place the differences between what he terms the male hermaphrodites and the female ones. These are, however, both male, as testicular tissue has been found in John Hunter's free-martin specimens still preserved at the London Royal College of Surgeons. The forms Numan describes, in addition to those like Hunter's, have a slightly different genital external development, the prepuce being present in a rudimentary condition and the testes more evident, although in an undescended condition either in the abdomen or in the groin. He thus discusses a non-existent sexual difference, but his description of

PLATE I.

FIG. 1.



FIG. 2.

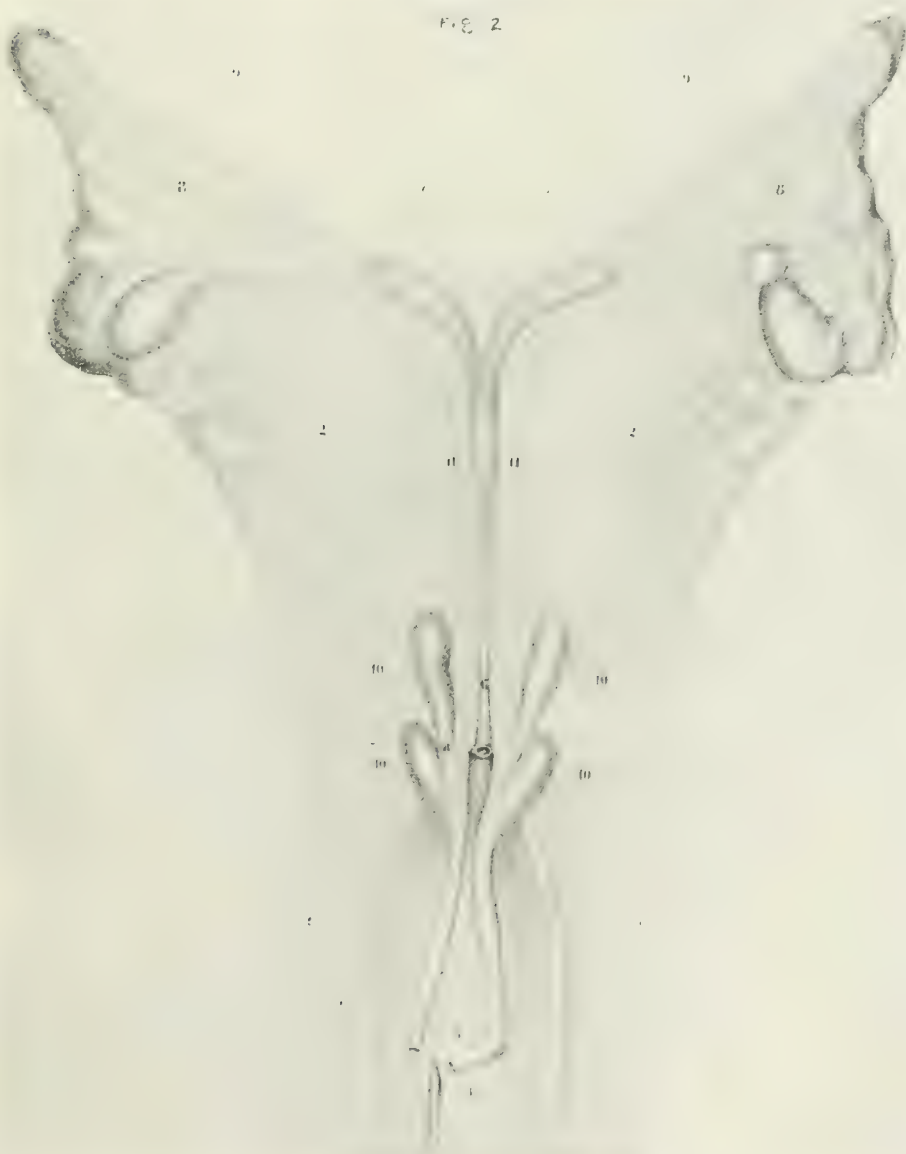


PLATE II.

Fig 1



Fig 2



Fig 3

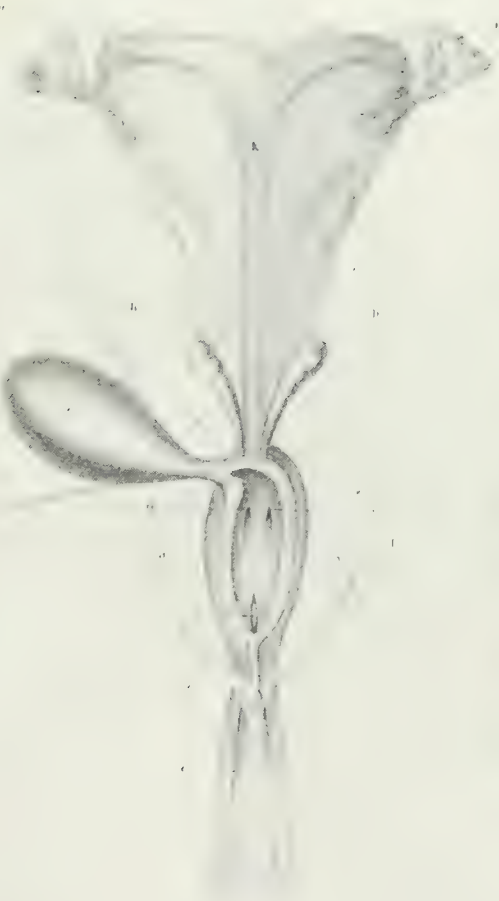
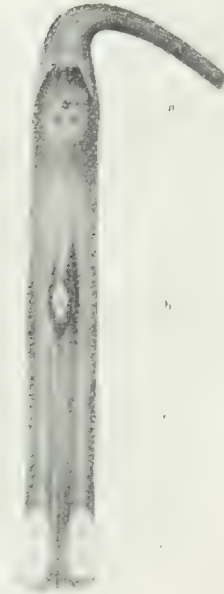


Fig 4



his own form of free-martin (*Stiermartin*) is valuable. In Hunter's and analogous specimens the testes are higher up in the peritoneal folds, and look like small ovaries as to position (Plate I., Figs. 1 and 2).

"The *Stiermartins* (*hermaphrodites mâles*), although resembling the female (*hermaphrodites*) as to the port of the horns, preserve more the natural conformation of the bull (Plate II., 1, 2). The body does not, as a rule, have a considerable development. It has more analogy to the ox than to the female hermaphrodite. It is similar in the separation, sweep, and length of the horns. The head possesses more the form of the bull. They thus approach to the bull when the testes are more completely developed, and to the female form if these are less so. Further distinctions between the *Stier*- and Hunter's free-martin are given, but as the sex is the same—male—it is unnecessary to give all the details.

"The testes are not in the scrotum. There is a fissure in the perineum with a very short phallus, testes more or less descended. The testes may be wanting or represented by amorphous fat with no proper testicular tissue. Sometimes the scrotum is open and bilobed. In one case with defective external genitals, no vulva and no vagina, there were also no testicles, matrix, nor ovaries. This case is given in great detail. Numan also mentions lunar hermaphrodites where a lunar and exciting influence seemed to be exerted on the mammæ of certain animals, but states he could find no convincing argument for such.

"Numan sums up this section as follows:—'Il conste de ce qui précède, qu'il existe dans les bêtes bovines, une différence marquée entre l'hermaphroditisme masculin et féminin, ainsi qu'entre les vaches hermaphrodites et celles que l'on a châtrées: tandis que dans les hermaphrodites mâles et femelles, on rencontre encore des variétés individuelles; mais il serait difficile d'en donner une description détaillée sans entrer dans des développements trop étendus.' This must be read in connection with what has been already said.

"6 Observe-t-on encore l'hermaphroditisme chez d'autres animaux?"

In this section Numan discusses hermaphroditism in other animals, especially in the horse, and also in the sheep and goat. In the horse it is very remarkable, and, so far as I know, only

described by John Hunter. In all the literature Numan gives on this subject there is only one English reference to a paper by Wotton in the *Veterinarian* for February 1841. Gurlt figures cases in the goat and sheep analogous to the free-martin—

“An important point to settle in such is whether there was a twin birth. Sebald, von Jennecker, Gohier, and others give no information on the nature of the birth. If the horse is advanced in age information cannot be obtained.*

“7° En quoi consiste le véritable caractère de ce vice de conformation, tant dans la bête bovine mâle que femelle ?

“In speaking of the hermaphrodites Numan singles out what he has described as female hermaphrodites for special consideration, the female hermaphrodite being Hunter’s free-martin. In these the horns are distinguished by being wide apart, very fine like those of the ox, by a narrow long head and a condition of the bones (ossature) less strong proportionately to their size. They are extraordinarily liable to be fat, and have the flesh delicate and very tender.† The vulvar labia are more or less imperfect, the labia minora small and atrophied, clitoris often voluminous, and longer than in the normal cow. It is not rare for it to go beyond the labia and be then somewhat like a small gland. The vagina is absent or less deep, narrow or terminating soon in a cul-de-sac. The uterus is at the same time very incomplete, and the body is often hardly recognisable and obliterated. In certain cases it only presents a rudiment of a membranous expansion with cords and knots here and there,‡ and sometimes a thin broad outline of the cornua. The cornua are always defective, but the tubes and ovaries § are present in a very imperfect condition, and in place of ovaries § one finds balls of fat (*des pelotes graisseuses*), studding the borders and surfaces of the broad ligaments.|| Two such were discovered during the siege of Maestricht (1838-39).”

* This is a difficulty in sale cattle, as usually no history can be given as to whether the animal was one of twins or single. In one free-martin I learned from the owner that the animal was from a single birth.

† John Hunter mentions this as a belief in England. Sometimes they are not, and perhaps there is then more testicular tissue than usual.

‡ I have seen this twice or thrice.

§ Really testes.

|| This is well shown in the plates.

Here Numan makes an important statement which I quote :—

“ Dans les hermaphrodites femelles, il n’y a jamais, autant que mes recherches me permettent de l’affirmer, mélange d’organes genitaux mâles et femelles et le nom d’*animaux à double sexe d’hermaphrodites* ou *Zwitter*, que leur donnent les auteurs français, anglais et allemands, est, par conséquent, inexact. La nature de l’imperfection dépend plutôt d’un développement incomplet de l’appareil sexuel, dont la cause première réside dans une perturbation de la force de formation à une époque peu avancée de la vie fœtale. Elle doit donc être attribuée tout simplement à un arrêt dans l’évolution ” (*Hemmungsbildung*).

This is an excellent statement, and places Numan’s work on a high plane. Had he interpreted the supposed canals of Gartner and the projections from them as the vasa deferentia and vesiculæ seminales and not as the analogous Gartner’s canals he would at once have seen that what he described as ovaries must be testes. There was unfortunately no microscopic examination in his time.*

He now goes on to describe what he believed to be Gartner’s canals.

“ Plate II., Fig. 3 represents these glandulo-tubular organs such as are seen in one of the hermaphrodites I have dissected after having injected them with mercury. They are displayed completely and in a developed condition. I have neglected their existence, my attention not being fixed on this organic system; but one can see the exact drawings of these in the subjects I examined. In Plate IV.† these glandulo-tubular organs ” (really vasa deferentia and vesiculæ seminales) “ are entirely broken up (*brisés*), the uterine neck being entirely formed by their scattered elements or been mingled with them. In my remarks on hermaphroditism of the bull I shall again have occasion to return to Gartner’s body ”‡ (or canal).

* He recounts a case, however, by Gurlt where the microscope was used.

† In Numan’s *Atlas*.

‡ What Numan means is this. In what he termed female hermaphrodites vasa deferentia and vesiculæ seminales are present, as figured by Hunter. Numan thought they were Gartner’s canals, and figured the sexual glands as ovaries. In the *Stiermartin* the testes are more evident, and he saw they were bulls, and therefore this explanation.

Numan then goes on in an important note to abstract and add to the original paper by Gartner, and I therefore transcribe it as a whole.

Numan's Note on Gartner's Canals.—The observations of Gartner, a Dane, on the persistent Wolffian ducts in the cow and sow are often quoted, but no statement as complete as Numan gives in this note in his monograph is known to me in English, and I therefore quote him in full on this point:—

“Quoique Galien (libr. ix. *De dissectione vulvæ*) paraisse déjà avoir connu ces organes et qu'ils aient été décrits par Malpighi (*Epistola ad Sponium*, pag. 26) et par Haller (*Elementa Phys.*, libr. xxvii. au mot *Muliebria*) ils semblent, depuis ces anatomistes avoir été perdus de vue, et leur histoire est tombée dans l'oubli, au point que, dans les ouvrages modernes de médecine vétérinaire, de physiologie et d'accouchements, on les passe sous silence, ou on ne les indique que superficiellement. Le médecin danois H. Gartner,* fut, par hasard, remis sur leur trace; il en fit l'objet d'un examen spécial, et on leur donna son nom. On en trouve une description, avec figures, dans *Kongelige Danske Videnskabsnævnets Naturvidenskabelige og Mathematiske Afhandlinger*; Kiöbenhavn, 1824, Første Deel, page 279, sous le titre: *Anatomisk beskrivelse over et ved nogle dyr—arters uterus undersøgt glandulöst organ*. Ce travail est analysé dans *Medicinische Zeitung*, 1824, S. 104. L'attention des principaux physiologistes est encore une fois fixée sur ce système d'organes. Ce sont des corps, partie glanduleux, parti tubiformes, situés à l'orifice et au col de la matrice; ils s'étendent le long du corps et des cornes de cet organe, vers les ovaires où, sans les atteindre, ils se perdent dans les ligaments larges. En bas et en arrière ils se terminent de chaque côté, à la hauteur du canal de l'urètre par une ouverture dans le vagin. Ces organes existent chez le cochon, la vache et aussi, suivant quelques-unes, chez la jument. Leur composition et leur direction ne sont pas les mêmes chez ces divers animaux; ils n'ont pas le même développement à toutes les périodes de la vie, et dans tous les cas, on ne les voit pas aussi distinctement; cela dépend du rut, de la gestation et d'autres circonstances. Plusieurs, entre autres, Hildebrandt (*Handbuch der Anatomie des Menschen*, Braunschweig, 1832, Th. iv. S. 445, 447), Jacobson,

* Usually written Gärtner in English as if he were a German.

Baer, Rathke (*Ueber die Bildung der Samenleiter, der Fallopische Trompete und der Gartnerische Kanäle in der Gebärmutter der Wiederkäuer*, dans Meckel's *Archiv für Anat. und Phys.*, Bd. vi. S. 379). Müller (*Bildungsgeschichte der Genitalien*, Dusseldorf, 1830, S. 127), Gurlt (*Lehrbuch der vergleichende Physiologie der Haussäugethiere*, Berlin, 1837, S. 239) regardent les canaux de Gartner comme les débris des canaux excreteurs des corps de Wolff, ou du moins comme étant en rapport avec ces derniers. Gurlt suppose que les organes ou canaux de Gartner se retrouvent chez tous les animaux, quoiqu' on ne les observe distinctement que dans les ruminants et les solipèdes.

“ Dans les *Anatomische Abbildungen der Haussäugethiere*, pl. 74, figures 2, 8, 8, de Gurlt, deux ouvertures sont indiquées sous la dénomination d'orifices des conduits vaginaux; on veut, sans doute, désigner les ouvertures des canaux de Gartner.

“ Après un grand nombre de tentatives réitérées et vaines, j'ai enfin acquis la conviction que dans le mouton, on rencontre des rudiments de ces organes; ils s'abouchent par deux orifices dans le vagin, près du canal de l'urètre: je n'ai pas réussi, jusqu' à présent, à y faire pénétrer une injection mercurielle.

“ Gartner remarque que leur ouvertures, dans le vagin de la vache, sont plus grandes que chez le cochon, et qu'elles sont situées plutôt en avant que sur le côté de l'orifice de l'urètre. Ces corps commencent par deux dilatations, sous forme de poches, appelées petites têtes (*capitula*); celles-ci se transforment en deux canaux qui se dirigent en haut, le long de la face interne du vagin, et arrivent jusque près de l'orifice de la matrice. Ici ils s'arrêtent et paraissent se terminer; mais ils plongent dans le tissu du col de l'utérus, et se représentent là où le col se confond avec le corps du viscère. Ils reparaissent encore à la face inférieure de la matrice, remontent le long du corps, se dirigent concentriquement avec les cornes, et disparaissent à quelques pouces de distance des ovaires.

“ La partie du canal qui appartaient au col de la matrice, est sujette chez la vache, à des changements déterminés par l'âge et la fécondation de la bête. La continuité de la portion vaginale et de la portion utérine est ordinairement rompue, en apparence. Dans la région où

les canaux rampent sur le col utérin, on trouve une rangée de petits élevures ou tubercules, qui ont un aspect glanduleux, et qui doivent être considérés comme un lien entre les deux parties principales de ces tuyaux. Parfois, il existe, au lieu de ces tubercules, un véritable canal. Celui-ci présente alors des dilatations sur les parties latérales; des vaisseaux sanguins les tapissent; il semble être un conduit excréteur commun. Ces dilatations donnent parfois au canal la forme d'une spirale. Dans un cas où le canal était ainsi contourné d'un côté, il se présentait, de l'autre côté, une quantité de cellules dilatées, dont quelques-unes avaient une dureté presque cartilagineuse, et une ouverture assez grande, pour y introduire le bout du doigt. C'est chez la vache adult que cette forme est la plus prononcée. Les tubercules sont parfois remplis d'une matière muqueuse. Il est rare que les canaux des deux côtés du col utérin, aient le même développement; car, quand on trouve d'un côté un canal, il y a de l'autre, des élevures glandulaires. Dans le veau le canal est moins interrompu, et non tout à fait spiral. Les cellules ressemblant à des tumeurs cystique, sont en plus grand nombre chez la vache, en automne, que pendant les mois de janvier et de février. De très-jeunes veaux présentent le canal, mais il n'a pas acquis son entier développement, le mercure ne pénètre pas au delà de la partie inférieure de l'ouverture, près de l'orifice de la matrice. Dans quelques cas, on réussit à le pousser jusque sur le col utérin.

“On voit par cette brève description que je n'ai donnée que sous forme d'extrait, d'après une traduction du *Mémoire sur les corps de Gartner*, écrit en Danois, qu'il existe beaucoup d'anomalies dans leur composition; j'en ai eu la preuve dans mes recherches, en les injectant chez les vaches pleines et non fécondées, ainsi que chez celles qui avaient vêlé depuis peu. Je ne pourrais dire positivement, avec lequel de ces divers états, leur plus ou moins de développement est généralement lié: de nouveaux travaux sont nécessaires.

“Les véritables fonctions de ces organes ne sont pas encore démontrées. On a prétendu qu'ils servaient de conduits pour amener le fluide séminal jusqu'aux ovaires, et que la fécondation aurait lieu par cette voie. Ces canaux, quoique s'approchant les ovaires, n'ont cependant aucune communication directe avec eux: cette hypothèse est donc peu probable. La structure glandulaire des corps tuberculeux,

la direction tortueuse des tuyaux, semblent faire naître l'idée qu'ils sont plutôt destinés à une sécrétion et à une excrétion qu' à absorber. Servent-ils peut-être à sécréter un liquide qui est répandu chez les femelles, pendant la copulation, *in summa coitus extasi*.

"Les anciens croyaient que la fécondation avait lieu par le mélange des fluides spermatiques du mâle et de la femelle (*Semper enim partus duplici de semine constat*, Lucrèce). Je ne me hasarderai pas à décider la question, mais je pense qu'un système d'organes aussi étendu et aussi compliqué que les corps de Gartner, n'est ni sans but, ni sans signification; ils sont dans un rapport direct avec les fonctions génitales quelle que soit l'influence qu'ils exercent. Ce sujet mérite d'être soumis à de nouvelles explorations."

This is a valuable account of Gartner's original paper on what are now termed Gartner's canals, especially as it draws attention to the parts analogous to the vesiculæ seminales. It is remarkable that although Numan mentions the opinions of Müller and others (*vide antea*), viz. that they represent the Wolffian ducts, he does not dwell on this happy and accurate comparison, but gives as his conclusion the opinion stated in the last two paragraphs of the quotation.

"I may remark that all those hermaphrodites * are really bulls (*véritables taureaux*) whose sexual apparatus is malformed. There is shortening of the phallus and convolutions and curvatures are present. The phallus does not therefore project much under the abdomen, arises a little distance from and below the anus, and shows externally *au travers du périnée* where it is covered with hair. It will not be difficult to distinguish male and female hermaphrodites by the characteristics I have given.† The former, among other things, have throughout‡ male sexual feeling and desire

* This may mean the *Stiermartin* or all the specimens of free-martin figured, probably the former.

† This clearly shows what is not quite evident at some parts of the monograph, namely, that Numan considered the ordinary free-martin as a female hermaphrodite. The *Stiermartin*, which he first described, he considers as a male hermaphrodite, basing his idea of hermaphroditism on the lower tract condition and not on the sexual glands.

‡ John Hunter says the opposite as to the ordinary free-martin. The *Stiermartin* may, however, have such desire, as it has more of the external male tract and better developed testes.

to approach the female. Not having found any mixture of sex in them they should not, it appears to me, any more than the females of this category, be placed among bisexual or hermaphrodite animals. It would be better to look on them as a perturbation or irregularity of the force of formation, the chief cause being the incomplete development of the sexual apparatus, and as a consequence the absence of certain parts, such as the scrotum and testicles. The division of the urethra and scrotum which the hermaphrodite males often show can be referred to a similar cause. I shall endeavour subsequently to demonstrate this.

“Male animals with defective conformation, such as the horse, the ram, the buck, goat, and dog, described as bisexual or as true hermaphrodites, do not differ from the bull as to genital anomalies. It has seemed necessary to me to add to this memoir—as subjects of comparison, and to clear up some of the facts—descriptions and illustrations of certain instances, but not having had any opportunity of seeing such anatomically in the horse and ass I refer the reader to the following authors.*

“In a horse examined by Gohier one found small testes between the aponeurotic expansion of the great oblique abdominal muscles, the defective (*prétendus*) mammillæ and the skin; the vessels were small and their lumen imperceptible. The vesiculæ seminales were small and the prostate and the phallus showed nothing remarkable. The horse had perfect tushes and male sexual habits.†

“In another case by the same author, scrotum and testes were absent; two mammillæ were very evident, and strong tushes were present. No internal sexual organs were found. An analogous case by Tennecker is quoted.

“If one admits that *the presence of the chief genital organs of the two sexes is necessary to constitute veritable hermaphroditism*—that the existence of an ovary or of one or two testes with their epididymis is *de rigueur*—one concludes that these were not true hermaphrodites. The absence of certain parts and of the scrotum does not suffice to establish hermaphroditism, as the absence of a sexual organ does not differ

* Numan gives in pp. 125 and 126 many authorities inaccessible to me. Home is the only English author quoted (*Phil. Trans.*, 1799, p. 158).

† This looks like a case of undescended testes. No mention is made of the condition of the external genitals as having any female characteristics.

from other anomalies *par defect*. *It is still necessary, if I am not deceived, to distinguish imperfection of sex and neutrality, from hermaphroditism.**

“Certain anatomists—Hunter, Mascagni, Scarpa, Borkhausen, and several others—have described and figured these individuals as true hermaphrodites in which they assert (*on prétend avoir*) they have found the generative organs proper to both sexes in one and the same animal. It would be perhaps rash to deny boldly the value of the observations of these celebrated men and to assert in fact that they had erred in their investigations. I recognise equally the importance of the considerations stated by other physiologists not less renowned touching the non-existence of hermaphroditism in the true sense of the word, and founded on their anatomical data. J. Müller thinks that those who have believed that they saw a mixture (*mélange*) of the sexes in one and the same individual are in error. He maintains that he has never met at the same time testes and ovaries, and then goes on to detail the possible errors in observation. Who, he asks, guarantees us the conscientious examination of the organs in the anomalies described up to this time? Who has seen the vasa deferentia of the testes? Who has examined the epididymis? Numan emphasises the above by his own observations and goes on to criticise Hunter’s cases.† This is of interest, and I therefore give it fully.

“Hunter describes a hermaphrodite animal which resembled an ox more than a bull or cow. The vagina was blind, and terminated a little above the urethral orifice, and at this point it was closed as well as the uterus. The latter viscus was divided into two horns, at the extremities of which were testes in place of ovaries. They were more than twenty times the size of a cow’s ovary and also as big as a bull’s testes. The vesiculæ seminales or pouches (*bentel*, bags) were placed between the bladder and uterus; their ducts opened in the vagina a little above the urethral orifice, but one cannot discover anything which had any relation to the vasa deferentia. The external genitals were more those of a

* Nothing could be put more admirably, especially the underlined portions. It is the neglect of these principles that has made the present-day confusion in regard to hermaphroditism.

† Numan quotes Hunter’s well-known *Observations on Different Parts of the Animal Economy*, Scheller’s translation.

cow than a bull, the clitoris feminine, and not in size between the clitoris and phallus, as one notes in the hermaphrodite horse Hunter describes.* There were four mammillæ, and the glandular substance was small.

“Numan next describes—Mr. Arbuthnot’s free-martin (Pl. I. of Hunter’s monograph), where Hunter stated there were ovaries and testes. This, however, is a mistake, as Spiegelberg showed in his case that the two bodies were testes and Wolffian body remains. Finally, he gives Hunter’s third case, Well’s free-martin, and criticises Hunter for describing certain parts of the narrow tubes as vasa deferentia, and states: ‘Il me semble qu’on trouve dans ces descriptions des indications non équivoques que les canaux et les corps de Gartner ont été confondus avec les conduits déférents et les vésicules séminales.’ Hunter, however, was right, and Numan made a cardinal mistake in describing the vasa deferentia and vesiculae seminales in certain of his cases as Gartner’s canal and body. Had he not, he would have had the honour of showing that the ordinary free-martin is a defective bull like the *Stiermartin*, i.e. all free-martins are male in sex.

“8° A quelles causes les plus probables doit-on attribuer cette anomalie ?

“This is the last question Numan considers, and does so at considerable length. I must take it up, however, briefly, for reasons of space. Numan passes from his abundant facts to speculation. *J’arrive sur la terrain de la spéculation* is his statement. He points out that animals destined to produce one foetus at a birth are apt, in producing twins, to have one of them deformed. Meckel and Vrolik, whom he quotes on this, point out that apparently the force to produce one subject is not sufficient for two, and one naturally recalls allantoido-angiopagous twins in this idea.

“In animals giving rise to several young, as in ewes, sows, etc., when the number is above the average foetuses, less developed or defective are found to occur. The apportionment of the force of formation among several individuals at one time and the insufficiency of nourishment may check certain elements that are proper to development. The same will hold in the cow if we regard twinning in man and in

* This is Hunter’s Mr. Wright’s case. I have compared Hunter’s text and plate and find Numan accurate in his summary.

cattle in the same light. Gurlt gives a statistical table of 740 monstrosities in domestic mammals, the proportions being as follows:—

“The ass . . . 3	The dog . . . 78
The mule . . . 3	The pig . . . 87
The goat . . . 24	The sheep . . . 179
The horse . . . 56	The cow . . . 239”
The cat . . . 71	

One sees from this how bovine animals greatly outnumber those of other species in the number of deformities. He draws a graphic picture of the artificial life of the cow, and thinks that this, especially the persistence of lactation during gestation, disturbs nutrition and affects the offspring in the direction of deformity. The persistent confinement of the animal to a constrained position he also thinks a factor.

He discusses Earl Spencer's valuable researches* as to the duration of gestation in the cow, but I postpone the consideration of these to another occasion.

Numan thinks that double and monstrous births are influenced by local and temporary causes—atmosphere, vegetation, force of rut, and so on—but this need not be detailed, and some of his results are based on error—for instance, that of the ordinary free-martin being a female hermaphrodite instead of a sexually imperfect male. He notes that the potent twin is usually larger and first born. According to him the peasants say: “*Le mâle s'est rendu maître de la femelle, en lui ravissant une partie de la nourriture qui revenait à cette dernière.*” In conclusion Numan discusses the effects of castration in the male, and compares such with the free-martin. He also applies skilfully the physiology of his time to elucidating the nature of the rudimentary mamma, but as this summary has already run to some length I omit all reference to this part. He finally and rightly finishes by asserting that such monstrosities are not hermaphrodites, in spite of the general opinion of his time to the contrary.

* Earl Spencer's statistics are valuable. In 764 cows the interval between insemination and the birth of the calf lay between 220 and 313 days. The statistics as to the births are 340 cow-calves, 395 bull-calves, 7 twin cow-calves, 5 twin bull-calves, and 11 free-martins, the last all sterile and described as 11 twin cow- and bull-calves—an average of 1 in 69.

THE ATLAS.

The atlas itself is a handsome large quarto, text and plates separately bound in green paper. The titles are—

VERHANDELING
OVER DE
ONVRUCHTBARE RUNDERN
BEKEND ONDER DEN
NAAM VAN
KWEENEN,
in verband tot sommige andere
dieren met misvormde
geslachtsdeelen
Met 23 groot-kwarto platen
DOOR
DR. A. NUMAN, ETC.
UTRECHT
N. VAN DER MONDE
1843

For the plates the title is—

PLATEN
BEHOORENDE BIJ DE
VERHANDELING
OVER DE
ONVRUCHTBARE RUNDERN
BEKEND ONDER DEN NAAM VAN
KWEENEN,
in verband tot sommige andere
dieren met misvormde
geslachtsdeelen
DOOR
DR. A. NUMAN
23 Platen
UTRECHT
N. VAN DER MONDE
1843

A fairly long list of subscribers to the monograph is given, but they are all Dutch. W. Vrolik of Amsterdam, the author of

the well-known atlas, *Tabulæ ad illustrandam embryogenesis hominis et mammalium tam naturalem quam abnormem* (1849), is a subscriber. The plates themselves are large and very artistically executed. They are briefly as follows:—

Pl. I.—Vaarskween or free-martin. Pl. II.—Internal organs of I. with small separate portions of testes described as ovaries (eijernesten); vasa deferentia and vesiculæ seminales described as Gartner's canals (onvolkommene Gartnersche buizen); the external genitals are figured. Pl. III.—Internal organs (Fig. 1) and external genitals of a vaarskween; ovaries and Gartner's duct described instead of testes, vasa and vesiculæ seminales. Pl. IV.—As in III.; much as in II. and III., but a great many clumps of fat. Pl. V.—As in Pl. IV.; internal organs as in others. Pl. VI.—Another vaarskween or free-martin. Pl. VII.—Internal organs of animal in VI.; well marked. Pl. VIII.—Organs in Pl. VII., but vasa deferentia and vesiculæ seminales injected with mercury and well displayed. Pl. X. is what Numan calls a stierkween; is like the free-martin, but has a rudimentary prepuce (see text). Pl. XI.—Internal organs of X., and shows condition differing from previous ones; testes, vasa deferentia, epididymes, etc., present; Numan describes this correctly as a male. Pl. XII.—Another stierkween. Pl. XIII.—Internal organs of XII.; these resemble the vaarskween (Hunter's free-martin), and not the stierkween of Pl. X. Pl. XIV.—Internal organs of another stierkween with long prepuce; testes rightly described. Pl. XV.—Calf with double scrotum (balzaak). Pl. XVI.—The same as in XV., with rump held up to show parts on lower surface of abdomen. Pl. XVIII.—Eight-year-old hengstkween or stallion with external parts of mare; testes undescended. Pl. XIX.—Another hengstkween; phallus pendent vertically. Pl. XX.—Hengstkween with phallus pendent (Figs. 1 and 2); directed backwards in Figs. 3 and 4; rudimentary mammae. Pl. XXI.—As in XX.; phallus directed backwards. Pls. XXII. and XXIII. give figures of goats, a ram, and a sheep whose external organs simulate or are equivalent to the free-martin condition, but the internal organs were not obtained, and therefore it is needless to describe them.

The question still remains unsolved why cattle should have in their offspring such a preponderating number of twins derived from one zygote, and with unequal segregation of the doubled determinants in the zygote. One can only note that the cow has more of the non-potent elements in the shape of Gartner's canal and

glandular structures than other higher mammals. It has thus a less complete phylogenetic elimination of the Wolffian ducts concerned in the establishment of sex, but the exact significance of this, so far as it may permit a more primitive form of twinning in animals usually having uniparous birth, is as yet in the dark. The human species, sheep and goats, etc., have a less representation of Gartner's canal, and in them free-martins are very rare.

HISTORICAL RESUME OF THE NATURE OF THE FREE-MARTIN.

Past Observers.—The chief names associated with the subject of the free-martin are John Hunter, Numan, Simpson, and Spiegelberg.

The popular opinion tenaciously held for many years by agriculturists that an apparent cow calf born co-twin with a potent is almost if not invariably sterile, and presents in many respects the appearance and capabilities of an ox or castrated bull, has been amply justified, and supports strongly a plea much needed for respect to the opinions of practical lay observers.

John Hunter began the inquiry in a most brilliant manner. Of the three specimens examined by him he stated that one had ovaries, vasa deferentia, and vesiculæ seminales, with the external parts and urinogenital sinus of a female; one had both ovaries* and testes; and one testes, the other parts of the genital tract being much as in the first two specimens. Hunter did not recognise that in the case where he thought there were ovary and testis the real organs were testes and Wolffian relics. This has been found to be the case in his specimens still preserved in the Hunterian Museum. The recent examination of these by Dr. Arthur Keith has demonstrated this. This specimen was therefore not a hermaphrodite, as Hunter supposed.

Numan's monograph is the most outstanding of all, and the only recognition it received till lately was in 1861 in Spiegelberg's article, and so far as I am aware, and apart from Holland, it became completely lost. He had, however, examined more specimens than any other observers, figured their external appearance in a most artistic manner, and also given drawings of the internal organs in a most thorough fashion. He recognised that in certain cases—the *Stiermartin*—the animal was a sterile male,

* Hunter drew attention to the fact of the supposed ovary having a capsule with an aperture. Thus the testis is surrounded by a peritoneal capsule, a fact of great significance in its bearing on the normal descent of the testis.

and also combated successfully the view that the free-martin was hermaphrodite. In this he was most advanced, and far beyond the current opinion in many modern circles.

Numan did not, however, see that the free-martin described by Hunter was an imperfect male. He mistook the vasa deferentia and vesiculæ seminales for Gartner's canal of the cow (the rudimentary Wolffian duct), and the testes for the ovary. There was little or no microscopic examination in his or Hunter's day, and thus the error was easily made. He also speaks of the ordinary free-martin—Hunter's free-martin *—as a female hermaphrodite, and the *Stiermartin*—Numan's free-martin *—as a male hermaphrodite, while elsewhere he states his non-belief in hermaphroditism in mammalia. He is the most learned and scientific of all the observers, and his bibliography is most copious and cosmopolitan, as he quotes Latin, English, German, Danish, and French observers abundantly and to the point. He must therefore take rank in my opinion as a most celebrated medical and veterinary scientist. He also considered in clinical cases the question of a free-martin with a potent female and a non-potent one, and this is still a possible but as yet undemonstrated condition.

J. Y. Simpson discussed the question of the possibility of a human female co-twin with a potent male being sterile, and showed this was not the case. It is remarkable that so far as is known no free-martin exists in the human species where twins are born, but I believe it may occur as a single case and by another mechanism. In the human species boy and girl twins are from separate non-identical zygotes. The essence of identical twins† (normal or with one malformed) is that *one zygote gives rise to both, and that they are of the same sex*. Simpson's article is both cogent and scientific.

We now come to Spiegelberg, who wrote the most thorough and scientific paper yet published on this subject. His case was a calf free-martin with a co-twin potent bull, and he dissected and identified the structures in the peritoneum, examined the sexual glands and the structures near them microscopically, and identified the apparent double sexual glands as testes and Wolffian body. He identified and figured the following structures:—rudimentary Müllerian element of uterus; vesiculæ seminales; vasa deferentia; imperfect testes; rudimentary Wolffian body. His

* These terms are convenient.

† See paper by the author on "The Theory of Enzygotic Twins," *Edinburgh Medical Journal*, Oct. 1911.

conclusion on the testes is as follows:—"Da nun die betreffende Körper auf beiden Seiten hauptsächlich aus Canälen bestanden, so ist keiner von ihnen für einen verkümmerten Eierstock zu halten: sie sind vielmehr entschieden in der Entwicklung gehemmte männlichen Geschlechtsdrüsen. Es wird wohl am richtigsten sein, die Körper g* in anbetracht der Zartheit und des Verlaufs ihrer Canäle für die rudimentären Hoden, die nach aussen gelagerten h* wegen der Grösse ihrer Canäle, der Ausbuchtungen derselben für die Reste der Wolff'schen Körper zu halten."

MODERN VIEWS ON THE NATURE OF THE FREE-MARTIN.

The four great observers whose views have been detailed were hampered, as every generation of scientific observers usually is, by inadequate knowledge of facts or defect of methods. The defects of the knowledge of the time may be stated as follows:—

1. *Imperfect Knowledge of how Twins Arise.*
2. *Inadequate Appreciation of the Rudimentary Opposite Genital-Tract Elements in each Sex of Mammals.*
3. *Inaccurate Conceptions as to what Constitutes So - Called Hermaphroditism.*
4. *Mendel's Discovery had not yet happened.*

1. *Imperfect Knowledge of how Twins Arise.*—The chief ways in which twins arise are—

(a) From one zygote or fertilised ovum. This may give two identical and perfect twins, either male or female; one perfect male and one imperfect male twin, such as the free-martin in cattle; peculiarly deformed twins in man and other mammals, known as allantoïdo-angiopagous twins; and several other monstrosities.† The possibility of the free-martin and its potent co-twin arising from one zygote was not recognised till B. S. Schultze pointed out that identical twins arose from one zygote.

(b) From two separate zygotes, the resulting twins being of different sexes or of the same sex, and thus non-identical. This explains the puzzle to the old observers of a twin bull and cow calf both perfect in sex. Possible calf twins are therefore as follows:—

From One Zygote.—(1) Identical male twins; (2) identical female

* See his article or the author's paper "On the Free-Martin," *Proc. Roy. Soc. Edin.*, 1909-10.

† See author's paper in *Edin. Med. Journ.*, October 1911.

twins, both comparatively rare; (3) one potent bull and one imperfect and sterile bull, the free-martin common; (4) one perfect female and one imperfect female, not demonstrated yet, but theoretically possible.

From Two Zygotes.—(1) Two non-identical perfect males; (2) two non-identical perfect females; (3) one perfect male and one perfect female non-identical. It is this division (3) that gave ground for doubt until it was recognised that the free-martin and its potent brother arise from one zygote.

2. *Inadequate Appreciation of the Rudimentary Opposite Genital-Tract Elements in each Sex of Mammals.*—The existence in the human female of the epoophoron, the equivalent of the epididymis along with the characteristic potent organs (ovary, uterus, vagina) and the analogous presence of the hydatid testis and prostatic utricle (Müllerian and hymeneal) in the human male have been long known, but until recently treated as interesting but unimportant relics of a previous double sex in past times. They are of the greatest significance in the phylogeny of sex, but I only point out their bearing on the free-martin at present. It is now evident that the free-martin, co-twin with a perfect bull, has served out to it in the allotment from the one zygote, the rudimentary organs based on a female type, viz. the hydatid testis and prostatic utricle (single or doubled) of the potent bull co-twin. The whole anomaly arises in the early intrinsic mechanism in the earliest stages when the determinants of the zygote are doubled and segregated.

3. *Inaccurate Conceptions as to what Constitutes So - Called Hermaphroditism.*—It is the sexual gland that determines the diagnosis of sex. The rest of the genital tract, when normal, makes up an individual normally equipped for *effective sex*. The subject cannot be discussed fully, but no case of ovary and testes has been established as co-existing in a mammal, and the ovum figured by Blacker and Lawrence in their excellent and careful paper can be interpreted as a degenerated sperm cell in the debris of degenerated tubular epithelium. In the case of a six months' hermaphrodite pig-fœtus given by Sauerbeck* what he figures as ova might be considered as primitive sperm cells, but it is difficult to be certain from a drawing. Thus there can be no lateral hermaphrodite and no ovotestis. The free-martin has been called a transverse or female hermaphrodite, but it has vasa deferentia, vesiculæ seminales, and testes, and the lower part of the

* *Frankfurter Zeitschrift für Pathologie*, iii. 339, 1909.

genital tract is the developed rudimentary hydatid testis and prostatic utricle along with the urinogenital sinus. All this may seem dogmatic, but space prevents me giving the full evidence at present.

What requires to be kept in mind is (a) that the normal single mammal has in the genital tract non-potent opposite sex relics which are necessarily larger in the adult alleged hermaphrodite; (b) that the statements as to the existence of "ova" in the sexual glands of alleged hermaphrodites are quite untrustworthy, the alleged "ova" being more probably imperfect sperm cells in isolated and degenerate seminiferous tubules.

4. *Mendel's Discovery*.—The points in Mendelism applying to the free-martin are—

1. *The Autonomy of the Unit Characters.*
2. *The Theories of Dominance and Recession.*

1. *The Autonomy of the Unit Characters*.—The hydatid testis and prostatic utricle—the non-potent organs—behave like a unit character, and become segregated into the free-martin, thus giving it its degenerated and defective lower genital tract, necessarily from its origin, on a female type.

In the *Stiermartin* the non-potent organs are more represented and a rudimentary prepuce is present, while the testes are more evident and farther descended in one case of Numan's. The non-potent organs make up, as it were, one of the bricks of the human female, and any transposition is effected by it as a whole.

Whether or not the non-potent organs are doubled or transported singly is not known, nor do we know the condition of the upper poles of the testes or of the prostatic utricle in the potent bull of the twins.

2. *The Theories of Dominance and Recession*.—If one holds that these represent some actual significance, then the non-potent organs are to be classed as recessive, and I have discussed this in a previous paper.* I have come to see, however, that all that the term dominant means in a unit-character is that in a crossing it is expressed first in the somatic part of the zygote of F^1 , while the so-called recessive quality in a crossing with two contrasted characters is distributed in a probability ratio in the propagative part of the plant or animal of F^1 , and that the recessive being thus

* See *Proc. Roy. Soc. Edin.*, 1909-10; also the author's *Phases of Evolution and Heredity*.

interned *quâ* F¹ in its propagative part only appears expressed in the plant in F².

The essence of the free-martin is that it is one of twins, arises from one zygote, and has a potent male brother. It itself has defective testes and vasa deferentia and vesiculæ seminales like those of its brother, but has also for the rest of its genital tract the hydatid testis and prostatic utricle of the potent bull transferred to it. It is not a hermaphrodite or even pseudo-hermaphrodite, and is best described by its popular name, free-martin, as that involves no special theory as to its origin. We still need to know the condition of the internal sexual organs of the potent co-twin bull and of the remaining tract of the ox, as well as more definite facts in regard to the skeleton, etc.

Numan may be classed, if not ranked, with Sprengel, Mendel, and Couper,* men of great insight and genius, whose work was not appreciated in their time. They had, however, the joy and satisfaction of seeing natural processes clearly and in advance of their time, not as other men, and this must have been their consolation in their Cassandra-like fate.†

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Gurlt. *Lehrbuch der Haussäugethiere*, Berlin, 1832, Teil ii. S. 191.

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Jäger. *Beschreibung von Hunter's anatomisch pathologischen Museum des Collegium der Wundärzte in London, aus dem Englischen, mit Anmerkungen*, Erlangen, 1835, S. 73.

Meckel. *Archiv*, Bd. v. S. 136. Numan quotes authors who state that we may have a hermaphrodite deformity in human twins, and Meckel found them to be males. Sir Everard Home thought we might have a free-martin in human twins, but J. Y. Simpson disposed of this idea, and Meckel gave a case where male and female were both fertile, twins evidently from separate zygotes. Numan's opinion on this agreed with the one Simpson expressed afterwards.

* For Couper the chemist see *Proceedings of Royal Society of Edinburgh*, xxix. p. 193.

† Merz, in his most valuable *History of European Thought in the Nineteenth Century*, Blackwood & Son, Edinburgh and London, 1896, gives at vol. i. pp. 240-48, some interesting additional facts on this point.

He adds the interesting fact that the mule's ovary may contain 10-15 Graafian follicles.

Meckel. *Handbuch der Pathologische Anatomie*, Leipzig, 1812, Teil i. S. 14.

Naegele. "Beschreibung eines Falles von Zwitterbildung bei einem Zwillingsspaar," Meckel's *Deutsche Archiv für Physiologie*, Bd. v. S. 136.

No case of strict free-martin, one of twins, has been recorded in the human species. Single cases analogous to the free-martin do occur, and I have already mentioned them. These I consider as due to a loss in the polar bodies at the time of the maturation of the primitive germ and sperm cell.

In Meckel's *Archiv für die Physiologie*,* v. 1819, S. 136, there is a remarkable case recorded by Naegele of Heidelberg, well known for his work on the Mechanism of Labour, Naegele Pelvis, etc.

Naegele states that in 792 recruits examined, three cases of genital deformities were found, and two of these were twin brothers. Their history is as follows:—When born they were regarded as girls and christened as such; after puberty they showed characteristics of the male sex, and therefore donned male clothing and undertook men's work.

They each had split scrotum simulating labia majora, each half with a testis; etc., and one of them had labia minora. Both had an enlarged and bound-down clitoris. When the labia were held apart a condition simulating the female vestibule and urethral orifice was revealed.

Halliday Croom (*Edin. Obstet. Trans.*, vol. xxiv.) has recorded an almost exactly similar case met in two brothers, 19 and 21, where the same initial mistake was made as to sex.

Naegele's case is unique so far as I am aware. The following is the explanation I offer:—

The case was one of identical twins, similar in development in almost every respect, and remarkable in this that each had exactly the same defect, viz. apparent labia majora (split scrotum), each labium with a testis in it; absence of the corpus spongiosum and no covering to the floor of the urethra, apparent labia minora being present except in the case of the second described, where they were wanting. They were not human free-martins.

I suggest the following in explanation:—

1. The one zygote (fertilised ovum) which gave rise to them was formed as usual by the union of two gametes (ovum and spermatozoon).

2. Each of these (in the sperm- and germ-cell condition) lost, prior to fertilisation, certain chromosomes, reducing the number of each to half that of the number necessary for the zygote.

3. In the chromosomes thrown off (polar bodies) were the determinants (hypothetical causes in the zygote for the adult organs) for the corpus spongiosum and those for the closing and uniting process of the structures forming the scrotum and urethral floor.

4. The remaining somatic determinants became doubled and segregated equally and laterally, thus giving rise to twins identical in their normal and abnormal conditions.

* Neugebauer in his *Hermaphroditismus* gives an abstract, p. 345.

5. Had the zygote determinants not doubled, a single so-called pseudo-hermaphrodite would have resulted, as in Croon's case of two brothers (19 and 21) already mentioned.

Sandford. *Medical and Physical Journ.*, xi.

Sebald, G. F. *Naturgeschichte des Pferdesausbach*, 1815. Numan adds a considerable amount of literature on genital deformities in the horse (*Journ. vet. et agricole*, 1844, pp. 125 and 126).

Spencer, Earl.* "On the Gestation of Cows," *Veterinarian*, 1839, p. 722, and 1840. In a note Numan says: "Chez nous on ne l'appelé kween que quand elle reste stérile. Hunter fait aussi cette distinction, et il nomme seulement *free-martin*, une femelle engendrée dans les mêmes conditions, mais qui ne procreée pas. Les anglais paraissent généralement appliquer la dénomination de *free-martin* à la femelle, qui naît avec un mâle de la même portée."

Varron. *De re rustica*, lib. ii. cap. v.

Weiland. Le mot "kween" servait à désigner dans les anciennes langues, qui ont une origine commune, une femme ou une ménagère. Les anciennes Germains nommaient la femme *quen* ou *quena*: les Suedois *qvinna*. . . . Les anglais ont aussi le mot *quean*, provenant de la même racine, comme terme de mépris, pour désigner une femme de mauvaises mœurs. . . . Le grec *γενή* . . . bohémien *zena*, lusitanien *schená*, le polonais *zona*, qui sont être tous peut les derivatives du verbe *γενναι*, engendrer: et auquel se rapportent chez nous, *kennen*, *bekennen* (connaître, reconnaître). En hollandais *Kween* désigne la femelle de l'espèce bovine, et plus spécialement une vache stérile. To this we may add that in "Scots" one may speak of a "saucy quean."

Youatt. *Cattle, Their Breeds, Management, and Diseases*, London, 1834, p. 538.

DESCRIPTION OF PLATES.

PLATE I.—FIG. 1 (reduced from Numan's Plate VI).—He describes the animal as a speckled three-year-old *vaarskween*, i.e. a heifer free-martin, Hunter's free-martin.

FIG. 2.—Internal genitals of the above.

1. The vagina laid open; really the vaginal portion of the urino-genital sinus.
- 2, 2, 2. The broad ligaments; clumps of fat associated with sexual glands.
3. Urethral opening.
4. Opening of the left Gartner's duct.
5. Opening of the right Gartner's duct.
6. Duct of the uterus.
7. The incomplete cornua.
8. Fibrous strands connected with remains of blood-vessels and Fallopian tubes.
9. Cornua of Fallopian tubes.
- 10, 10. Great and small capitula of Gartner's canal; vesiculae seminales.
- 11, 11. Gartner's canals; are really vasa deferentia.

* This was the third Earl Spencer (1782-1845), better known as Lord Althorp.

PLATE II. (Plate XII. of Numan's Atlas).—FIG. 1.—Two-year-old deeply-coloured stierkween.

FIG. 2.—*a*, anus ; *b*, perineum ; *c*, perineal cleft with prepuce : the glans is perforate.

FIG. 3.—Internal organs of above.

- a*, Urethra opened.
- b*, Narrow junction of urethra and bladder.
- c*, Oblong groove passing into glans.
- d*, Contorted glans as in goat or ram.
- e*, Retracted muscle of the phallus.
- f*, Erector muscle.
- g*, Blind openings.
- h*, Vesiculæ seminales.
- ii*, Vasa deferentia.
- n*, Incomplete testes.

FIG. 4.—*a*, anus ; *b*, opening in perineum with part like female genitals projecting ; *d*, prepuce between male teats.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, ROYAL COLLEGE OF SURGEONS OF EDINBURGH, AND ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

THE quarterly examinations of the above Board, held in Edinburgh, were concluded on 22nd January, with the following results :—

First Examination.—The following candidates passed the first examination :—Anna G. Stott, Edinburgh ; John W. Robb, Forth, Lanarkshire ; Oswald C. Macdonald, Forfarshire ; Harry Morley, Edinburgh ; James L. Hendry, Aberdeen ; John P. Fairley, Leith ; Alfred D. Gorman, Methven ; and Jackson B. Minford, Temple-Patrick.

Second Examination.—The following candidates passed the second examination :—John Martin, Glasgow ; John B. Aickin, Belfast ; Harry A. L. Guthrie, Leith ; William MacLeod, Glasgow ; John Berry, Leyland, Lancs. ; Andrew F. Readdie, Edinburgh ; Thomas E. Lawson, Coventry ; and William S. O'Loughlin, Cheshire.

Third Examination.—The following candidates passed the third examination :—R. Kaushosh, India ; B. S. Raj, Hyderabad ; Maud Bennett, London ; William Bannatyne, Paisley ; P. C. Ray, Bengal ; Louis Lazarus, Natal ; Octavus W. Bateman, Cork ; Alfred G. Cowper, Bombay ; Charles Cosgrove, Sydney, New South Wales ; Devendra Bharadwaja, India ; Victor J. A. Wilson, Aix-la-Chapelle ; Charles L. Patch, Madras ; H. S. Dastur, India ; Richard Dorset, New Zealand ; and James Williamson, London.

Final Examination.—The following candidates having passed the final examination were admitted L.R.C.P.E., L.R.C.S.E., L.R.F.P.&S.G. :—Ernest Layton Matthew, Scotland ; Thomas Maitland Crawford, London ; Samuel Ethelbert Mangenie, Mauritius ; Gerald Irwin Secluna, Burma ; Arthur Lloyd Edwards, Penygroes, North Wales ; Royapuram Nellaveran Raja, Madras ; Cyril Scotter Owen, Hale, Cheshire ; Violet Eulina Field, Nelson, New Zealand ; Henry Watters Dunnet, Ottawa, Canada ; Charu Chandra Bose, India ; Alfred Meares Billings, Birmingham ; Hugh Sharpe Williams-Roberts, Wales ; Romesh Chandra Mitter, India ; Henry Gilbert Lamberty, Mauritius ; and William John Herbert Davis, Liverpool.

A CASE OF AMŒBIC DYSENTERY OCCURRING IN A MAN WHO HAS NEVER BEEN OUT OF SCOTLAND.

By MAJOR D. G. MARSHALL, I.M.S.,

Lecturer on Tropical Diseases in the University of Edinburgh.

THIS case appears worthy of record for several reasons, but chiefly because it is the first case originating in Great Britain diagnosed during life. A similar case, complicated by abscess of the liver, in a man who had never been out of England, occurred a few years ago in Birmingham, and was reported by Saundby and Miller.¹ Unfortunately the condition was not recognised during life, its true nature only being revealed at the post-mortem examination.

Amœbic or, as it is sometimes erroneously termed, tropical dysentery is not confined to tropical or subtropical countries, but occurs in temperate climates; for example in North America and in Europe. Until recently it was stated that Great Britain, Scandinavia, Spain, and Portugal were the only European countries from which cases of the disease had not been reported.

Until the Birmingham case was published the disease had not been reported in Great Britain, though there is little room for doubt that cases which remained unrecognised have occurred in the past. It is hoped that the description of this case, with the methods employed for the detection of the entamœbæ in the stools, may prove helpful to medical men at home, and possibly lead to the detection of other cases.

How did the patient become infected? As will be seen from the appended notes of the case, he was a ploughman who had never been out of Scotland. As a result of a thorough investigation of his home surroundings, in which I was greatly assisted by Drs. Macdonald and MacLagan of Dunbar, under whose care the patient had previously been, some interesting facts were elicited.

A few weeks before our patient was taken ill a woman on an adjacent farm had suffered from somewhat similar symptoms. She had, however, recovered in the course of a fortnight, and the case was apparently one of simple colitis. Nevertheless, to make sure of the diagnosis her stools were examined, and neither amœbæ nor spores were found.

The question whether persons apparently in good health may be "carriers" of pathogenic amœbæ has been often discussed.²

On further inquiry it was found that towards the end of 1910 a time-expired soldier had returned from India, and lived in a cottage adjacent to the one occupied by the patient. The soldier had not suffered from dysentery but stated that many men of his regiment had been in hospital with the disease at Bangalore.

The stools of this man on examination revealed the presence of fairly numerous spores, but whether they were the spores of *entamoeba histolytica* could not be determined by mere microscopic examination. Portions of the stools were daily administered, with its food, to a cat for a fortnight. Up to the present the cat has not developed any symptoms.

On inquiry into the water supply it was found that during the drought of last summer the ordinary supply conveyed by pipes from the Lammermoors had given out, and consequently the patient had been accustomed to obtain his drinking water from a pipe fed by a "surface" spring in a stackyard. The water from this spring had formerly been greatly prized by the farm servants, but they had temporarily ceased using it on account of contamination from a midden.

Hay infusion is considered a good medium for the growth of amœbæ. It was found that on the East Lothian farms, as in other agricultural districts, the men do not use privies, but are accustomed to defæcate in any place outside which may appear suitable to them. It is therefore not improbable that the returned soldier, supposing that he was a "carrier" of amœbæ, had contaminated the source of the spring. With the onset of the hot weather of last summer the amœbæ found in the water of the stackyard a suitable medium for development.

It is reassuring to know that the pathogenic amœbæ, including the *entamoeba histolytica*, will only flourish in association with high atmospheric temperature, the requisite minimum being 75° F. There is no doubt pathogenic amœbæ are often imported into this country by dysentery patients returning from abroad, but it is only under exceptional climatic conditions, such as obtained last summer, that they are likely to cause fresh infection.

Another possible but improbable solution of the question would be that harmless amœbæ, so common in the intestinal canal of healthy persons, may under certain conditions assume pathogenic functions.

CASE.—T. P., aged 28, a ploughman, residing near Dunbar, was admitted to Ward 34 of the Royal Infirmary, Edinburgh, on the 19th November 1911, suffering from chronic diarrhœa.

History.—About seven weeks before admission he began to suffer from diarrhœa, the stools being of a very watery character and numbering three or four a day; the diarrhœa commenced suddenly one morning, the patient having been perfectly well the previous day. The stools for the first week did not contain blood, and defæcation was unaccompanied by pain during the first fortnight; later the stools became “slimy,” and contained whitish specks like pieces of mutton fat. As the disease progressed the stools became more numerous. They were slimy as before, and contained blood and whitish masses, evidently portions of mucous membrane. The patient states that about a fortnight before admission he was free from diarrhœa for two days and did not pass any blood during that time.

Previous Health and Social Conditions.—He has never had any serious illnesses. His parents, two brothers, and four sisters are alive and well. He has never been out of Scotland.

Physical Examination.—The patient, though somewhat anæmic, is a well-developed muscular man. Nothing abnormal can be found except in the digestive system.

Digestive System.—Complains of continual uneasiness over the lower part of the abdomen, with severe griping and bearing-down pains before and directly after defæcation. The stools are watery and of a reddish colour owing to admixture with blood; they contain white specks and shreds of mucous membrane with numerous amœbæ (to be described later). Tongue moist and clean. Abdomen, nothing abnormal on inspection; on palpation pain is elicited on pressure over the region of the colon. Nothing abnormal to be found on rectal examination. The liver is not enlarged, and there is no jaundice.

Blood and Temperature Chart.—In the early stages of this disease there is often irregular fever, and the blood shows a moderate leucocytosis of 16,000-18,000 per c.mm.

In this case, while in hospital, the temperature was only above normal on one day; the blood throughout did not give a higher count of leucocytes than 8200 per c.mm.

It may be well to state here that in the later stages of these cases pain and discomfort on the hepatic region with slight rise of temperature and a leucocytosis of 12-18,000 are signs of implication of the liver, and call for energetic treatment with ipecacuanha with a view to prevent the formation of an abscess in the liver.

Progress.—The patient while in the wards presented the usual typical symptoms of amœbic dysentery, especially the tendency to

relapse when the condition had much improved. Under treatment with large doses of ipecacuanha he had by the end of December 1911 improved so much that he was allowed up. He was at this time passing one semi-solid stool a day. In a few days, however, the condition became as bad as before, the stools numbered 6 or 7 a day, and contained large quantities of blood. In the course of a week under ipecacuanha and rectal injections of quinine the stools were diminished in number and free from blood. He is now (10th February) almost convalescent, passes only one stool *per diem*, and is rapidly regaining strength.

During the last 10 days amœbæ could not be found in the stools.

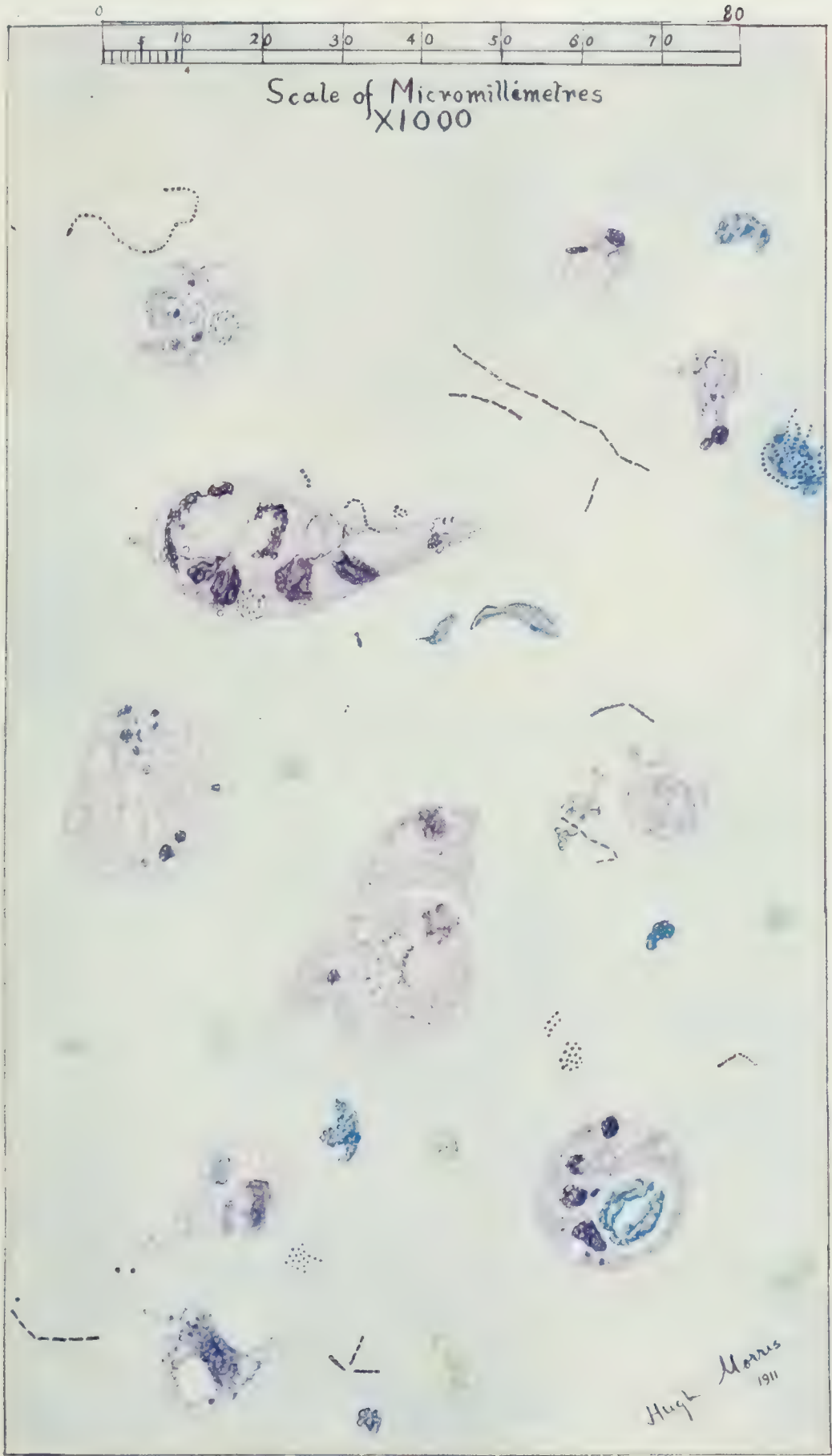
Diagnosis.—While the symptoms may be of help, detection of the amœbæ in the stool is the only certain method of diagnosis in this disease. In old-standing cases which have passed into the spore-forming stage examination of the stools is often inconclusive, and it is then necessary to carry out feeding experiments on animals.

Method of Examination of Stools.—Only the liquid part of the stools should be examined. Therefore if the patient is passing solid stools a saline purgative should be administered prior to the examination. Both unstained and stained films should be examined.

If it is desired to observe the movements of the amœbæ the stools should be passed into a warm bed-pan and, without being allowed to become cold, examined on a warm stage. In any case the examination should be carried out as soon as possible. If a stool is allowed to stand for a day or two the amœbæ become disintegrated and absorbed; in fact it is sometimes difficult to find them in a specimen which 12 hours previously showed them to be present in great numbers.

For detection in an unstained specimen it is simply necessary to take up a small portion of the stool on a platinum wire, spread this on a slide, and, after putting on a cover-glass, apply gentle pressure to spread out the film in a thin layer. It must be borne in mind that in examining unstained specimens it is essential to *cut off the light as much as possible*; neglect of this precaution often greatly increases the difficulty of examination.

On examination with a $\frac{1}{3}$ -in. objective, if the stool has been allowed to cool and the amœbæ are dead, small round refractile bodies (closely resembling in appearance oil globules) will be seen in the darkened field. With higher powers these will be found to



Film of stool from case of amebic dysentery originating in Scotland, showing various forms of the entamoeba histolytica. Stained thionin blue.

present a well-defined outline; the interior appears granular, and may show a faint nucleus and, possibly, both red corpuscles and leucocytes.

Stained Specimens.—Disappointing results are often obtained by the use of inappropriate methods of staining the film. I recollect once staining a slide (in which I had been watching the movement of numerous amœbæ) by Leishman's method, with the result that I was unable to find a single stained amœba.

The best stain for diagnosis is thionin blue. The film may be allowed to dry, or fixed while still wet with osmic acid (and then treated with a saturated solution of corrosive sublimate) or with formalin (40 per cent.) 1 part, methylated spirit 9 parts. This was the method employed in the slide illustrated in the colour plate. Allow the stain to act for 10 to 15 minutes, wash in water, clear with 2 per cent. acetic acid in water for a second or two, pass through alcohol and xylol, and mount in neutral Canada balsam or paroleine (as recommended by Coles).

The result is seen in the coloured plate. The numerous amœbæ of different sizes and shapes were all drawn from one slide. They vary in size from 10 to 50 μ , and show the characters of the *entamœba histolytica*, which are as follows:—I. The amœba is large, the outline well defined, due to the presence of a distinct ectosarc. II. The nucleus is eccentric and stains faintly. III. Contents include red and white blood corpuscles and bacteria. Some amœbæ have been fixed while still living and show projecting pseudopodia, others show binary division.

A disadvantage attending the use of thionin blue is the tendency of the specimens to fade. Heidenhain's iron hæmatoxylin not only gives more permanent results, but is useful in studying the nuclear elements.

Although the symptoms and the amœbæ found in the stools were typical, it was considered advisable to make cultivations from the stools to ascertain whether any bacilli of the Flexner group were present. This was done with a negative result.

CULTIVATION OF ENTAMOEBAE.

Many people have claimed success in the cultivation of pathogenic amœbæ.

Craig³ says: "The entire subject of the cultivation of the parasitic amœbæ of man is in a chaotic condition, and much more work will have to be done before it can be accepted that any of

the parasitic amœbæ of man have been cultivated." Greig,[†] as a result of the special inquiry on which he had been engaged on dysentery and liver abscess in Bombay, states that "the specific identity of the amœbæ in fresh stools and those in cultures was not clearly established, and the interpretation of the results of cultivations presents peculiar difficulties."

Many attempts were made to cultivate the amœba present in this case on Musgrove and Clegg's medium in combination with various symbiotic bacteria, but they were invariably unsuccessful.

Experiments on cats were carried out as follows:—I. Regular feeding with stool of the suspected "carrier." II. Feeding with stool of patient which microscopically showed spores and a few amœbæ. III. Injection into the lower end of the small intestine of a cat of 10 c.c. of liquid stool as II. Sufficient time has not yet elapsed for an opinion to be formed as to the results of these experiments.

Prognosis.—It is necessary to be very guarded in giving an opinion regarding the future progress of a case of this nature; in addition to the great tendency to relapses, even after long periods of quiescence, it must be borne in mind that abscess of the liver may occur months or years after the attack of dysentery.

TREATMENT.

Although the treatment by saline affords satisfactory results in bacillary dysentery, there is no doubt that in the amœbic form the best treatment consists in the administration of powdered ipecacuanha in 20 to 30 grain doses, combined with the use of solution of quinine for lavage of the colon. (An American writer has recently advocated the use of enormous doses of subnitrate of bismuth.)

Abscess of the liver is less likely to occur if ipecacuanha has been freely administered.

There are various methods of administering these large doses of ipecacuanha, all being, of course, devoted to the prevention of vomiting. (Ipecacuanha *sine* emetin has been recommended for use, but does not afford satisfactory results.)

Whatever method is employed, it is essential that when the dose is administered the stomach should be as nearly empty as possible, and that afterwards the patient be kept perfectly quiet in bed.

In places where the assistance of a skilled pharmacist is not

available, as in most tropical countries, the drug has generally to be administered in the form of a pill or suspended in some bland fluid, the patient being prepared by cutting off food and drink for 2 or 3 hours previously, with a good dose of opium or chloral half an hour before giving the ipecacuanha; it is also advisable to apply a sinapism over the epigastrium to assist in preventing vomiting.

Another method consists in making up ipecacuanha in pills, coated with some material which will resist the action of the gastric juices and dissolve in the small intestine. Salol and keratin have been recommended for this purpose. Personally I have had the most satisfactory results from the use of gelatine with the addition of a small quantity of formalin as a coating. It is absolutely necessary that the pills should be freshly and skilfully coated. If kept for a few days, or if an excessive amount of formalin is used, they are apt to become hard and insoluble, and are passed unchanged through the intestine.

It is well to diminish the dose of ipecacuanha after two days and discontinue it for a while at the end of 10 days. The administration should be recommenced if any exacerbation of the symptoms develop.

In conclusion I desire to express my thanks to Professor Wyllie for handing over the case to me for observation; also to his resident physicians for the great assistance they have afforded me in the investigation. To Dr. J. M. Murray, Clinical Assistant in Ward 34, belongs the credit of first detecting the presence of amœbæ in the stools of this case.

REFERENCES.—¹ "A Case of Amœbic Dysentery with Abscess of the Liver in a Patient who had never been out of England," *Brit. Med. Journ.*, 27th March 1909. ² Vincent, "Les Porteurs d'amibes," *Bull. Soc. Path. Exot.*, 10th February 1909. ³ *The Parasitic Amœba of Man*, 1911. ⁴ *Scientific Memoirs of Officers of the I.M.S.*, No. 47, 1911.

TRAUMA AS A FACTOR IN DISEASE.

By ALEX. JAMES, M.D.

I.

WHEN an ordinary bar magnet receives a heavy blow from a hammer its magnetism becomes more or less adversely affected, as the result, we say, of changes produced in its molecular condition by the shock or concussion. According to the violence of the blow its demagnetisation will vary in completeness, and similarly according to the violence of the blow there will be variations in its power of recovery.

Except for this change in its magnetism the metal shows no other change which can be demonstrated.

In the same way, when a living tissue is subjected to a concussion its vitality can be diminished or lost temporarily or permanently. Similarly in such a case, if we examine the tissue no other change in its structure may be demonstrable.

Of course there are many differences between the magnetism of a bar of steel and the vitality of a piece of tissue, alike as regards how they can be affected, and as regards their powers of recovery. Thus in living tissue not only may we have the concussion inducing the equivalent of this molecular change, with its associated lessened capacity to nourish itself, and consequent increased vulnerability to organic or toxic products around, but we may have the concussion inducing also breach of continuity of tissue, rupture of blood-vessels, bleedings, etc., and secondary troubles caused thereby.

Furthermore, in living tissue not only may we have this molecular change caused by mechanical concussion or shock, but we may have it caused also by other kinds of injury. Thus chemical shock, as from exposure to noxious or irrespirable gases, electric shock, shocks due to extremes of heat or cold, or shocks due to psychical causes may all be met with. Notwithstanding all this, however, a general analogy between a bar magnet demagnetised by a blow and a living tissue devitalised or paralysed by concussion or shock can appropriately be recognised.

The next point to which attention has to be drawn is that whilst any living tissue may be thus affected by concussion or shock, yet the most immediately serious and the most far-reaching effects for harm are produced when the tissue which is involved is nervous tissue. Thus whilst concussion of a muscle impairs to

a greater or less degree its power to contract and to nourish itself. concussion of brain cord or nerve not only impairs function at the affected part—and much more easily because the tissue is more delicate—but because brain cord and nerve form as it were the specialised governing and trophic radiating tissues, it can impair or abolish function in other parts of the body as well, and to a correspondingly great extent. This merits some further explanation and illustration.

Physiology shows us that from the brain and cord there is constantly radiating out along the nerves to the tissues a centrifugal, tonic, trophic, or nutritive influence, in consequence of which the tissues are able to nourish themselves or build themselves up out of the nutritive material in the blood with which they are supplied. In this way what is called tissue anabolism is brought about. For example, if the nerves to a muscle or a gland be divided or blocked, degenerative changes can soon be recognised passing along the nerve fibres centrifugally, these in their turn being associated with atrophic or degenerative processes in the corresponding tissues, muscle, or gland, or whatever they may be.

But now it must be noted that if this centrifugally radiating trophic force be intensified, it causes in this or that tissue not a tonic or building-up process, but a breaking-down one—the so-called katabolism. With this katabolism is normally associated the manifestation of the function of the tissue, *e.g.* in the muscle, contraction with increased heat production; in the gland, secretion, with increased heat production.

But the specially important point to be remembered here is that this centrifugally radiating force which, carried out to muscles or glands, can produce in them anabolic or katabolic processes, is the same in kind in both conditions. The illustration of this which I have always made use of is that of the sun's rays falling on a plant. Thus when sunlight in its ordinary diffused form falls on a leaf it causes there an assimilative process, *i.e.* a building-up of tissue or anabolism, and this is associated, as we should expect, with deoxidation and a relative lowering of temperature. If, on the other hand, the sunlight concentrated by a lens be made to fall on a leaf, there result a dis-assimilative process—a breaking-down or katabolism—and this in its turn is associated with oxidation and a relative rise of temperature. In this way can be recognised an analogy between the emanations radiating out on the earth from the sun and this nerve force, or, as George Henry Lewis has called it, neurility, radiating out to the tissues from the cerebro-spinal axis.

But, again, physiology shows us that from the skin, from the special sense organs, from the muscles, and probably from other tissues as well, a neurility or trophic force must in certain measure be recognised as passing back centripetally to the cerebro-spinal axis, exercising there what may be called a retro-tonic or retro-trophic influence. Thus, if an eye or ear be destroyed, degenerative changes can be recognised passing centripetally to the visual or auditory centres. Similarly, like retro-tonic influences have been demonstrated from muscles and other tissues. With regard to those latter, whilst much work has been done by recent writers—Kopp, Marinesco, Goldscheider and others*—for the purpose of demonstrating that the integrity of the muscle trophic cells in the cord and other centres is dependent on their being reached by centripetal impulses from the muscles, the experiments of an older writer, Rumpf,† are in this connection so clear and definite that they are well worth being recalled.

Rumpf showed that if in the frog the spinal cord was divided at two places, and if the motor nerve roots leading to this separated portion were also divided, this portion became absorbed, and indeed rapidly disappeared. In this way he demonstrated this retro-trophic influence of the muscles on the nerve centres. But Rumpf also found that if a portion of the spinal cord were separated as before, and the sensory nerve roots divided, a similar but less-marked absorption of the portion of spinal cord resulted. In this way he showed that from the surface of the body also a trophic influence is passing to the centres. The explanation of this which I have already adduced‡ is that there is in animals an absorption of certain of the solar radiations which impinge upon their surfaces, just as there is in plants, but that whilst in the latter the energy derived therefrom is directly stored up by tissue anabolism, in the former it, after being transformed into neurility, is directly or indirectly stored up as such to manifest itself in the production of anabolic or katabolic processes in this or that tissue or organ, and from time to time, according as the infinitely complex needs of the organism demand. This subject, however, need not detain us longer, but what for our present purpose is important to bear in mind is—(1) that this neurility or nerve force acts in both directions, *i.e.* centrifugally and centripetally, whether the nerve be

* Compare Oppenheim's *Text-Book of Nervous Diseases* (Bruce's translation), 1911, p. 66.

† Pflüger's *Archives*, 1881, p. 415.

‡ *Edinburgh Medical Journal*, vol. xxvii. p. 340.

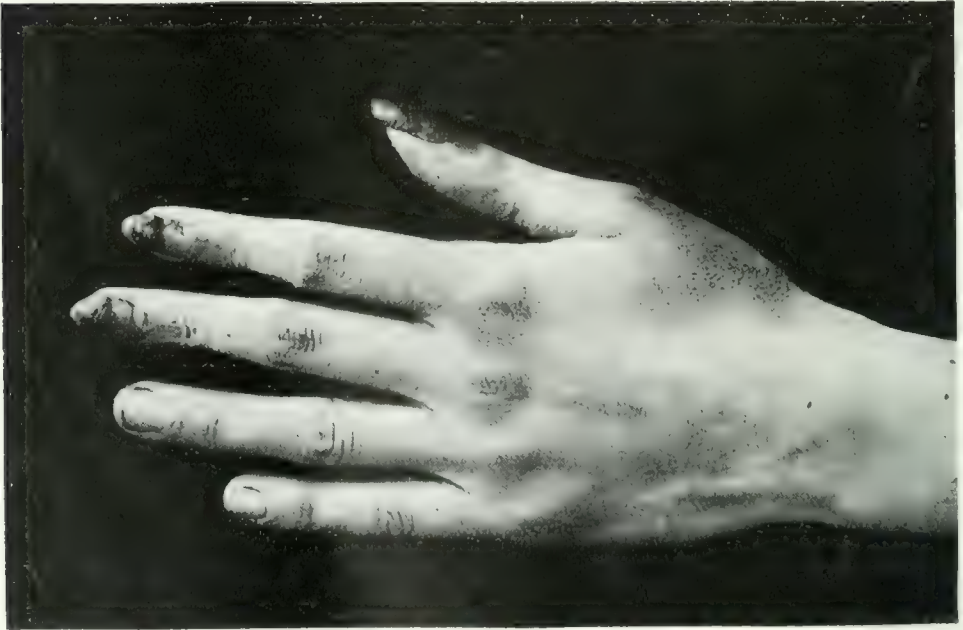


FIG. 1.—LULY W. ON ADMISSION.



FIG. 2. LULY W. NINE WEEKS AFTER OPERATION.

ONYCHIA THE RESULT OF NERVE INJURY.

functionally a motor (efferent) or a sensory (afferent) one: and (2) that, therefore, when any condition exists which influences morbidly this neurility at any part of the cerebro-spinal axis or nerves, morbid effects produced thereby have to be looked for, and may be traced along both directions.

Bearing all this in mind, we can easily understand how anything which disturbs function at any part of the nervous system may have the far-reaching and peculiar effects of which some examples are to be found in the following cases:—

The photograph (Fig. 1) represents the condition of onychia which was produced in the thumb, index and middle fingers of a girl as the result of nerve disturbance. This girl, aged 19, was admitted to my ward 25th November 1902, and told me that this condition of the fingers had started 7 or 8 years before. She first noticed that the three fingers began to feel cold and numb, next a black mark appeared at the root of the nail of the index finger, gradually increased in size, and the nail cracked and fell off. There was much pain in the finger at the time, and the pain extended up the arm and was increased on using the hand. Very soon the thumb and middle finger became affected in the same way, the condition became such as is represented in the photograph, and the patient had to give up work. As can be seen, the finger-nails were greatly thickened, elongated, and curved, the corresponding fingertips becoming somewhat atrophied.

During the 7 years in which the disease had existed many remedies had been tried—removal of the affected nails, applications of mercurial, tar, and other ointments, electricity and X-ray treatment, etc., on the theory that it was a tuberculous onychia. Investigation of the case revealed that with a tubercular family history she had undergone, when 7 years old, several operations for bone disease in the neighbourhood of the elbow-joint. Examination of the elbow showed extensive cicatrisation, and on the theory that the onychia was due to nerve-kinking and irritation the cicatrix was cut down on and the median nerve was found, not in its usual situation, but kinked down close to the internal aspect of the elbow-joint, and fixed in a mass of cicatricial fibrous tissue. The nerve was freed, and even on the day after the operation the patient expressed herself as feeling the arm distinctly better.

The second photograph (Fig. 2) shows the condition 9 weeks after the operation. The affection thus ended in complete recovery, the patient then being able to use the hand for sewing, etc., quite freely.

In this patient it will be noticed there was no real trauma; the case is adduced, however, as demonstrating the peculiar effects on tissue nutrition which may be induced by conditions of defective or altered neurility, the result of nerve lesion.

The next photographs (Figs. 3 and 4) are of a young man of 23 who was under my charge in the Infirmary many years ago, suffering from slight rheumatic symptoms. He presented fairly well-marked atrophy of the left side of the face, and of the corresponding side of the tongue, and he told us that this had showed itself first about the age of 14, and had become gradually more and more marked as the years went by. He considered, however, that the wasting had stopped within the last three years. On questioning him we ascertained that he had noticed this hemiatrophy developing some months after he had received a slight cut from a piece of glass in the corresponding cheek. The slight scar which this left was still visible close below the angle of the mouth on the left side.

In this instance the trauma, slight though it was, had possibly been a factor in putting into action those morbid changes in the trophic centres of the face and tongue which had determined the hemiatrophy. As a factor, however, it was probably insignificant in comparison with the constitutional condition of the patient.

The next case is one in which the trauma affected not only the injured side but the opposite side as well. It is that of a healthy-looking young soldier, who was admitted to my ward in June 1900 with a marked form of Raynaud's disease (local asphyxia) (see Fig. 5).

The history of this was as follows:—At the fight at Magersfontein on 11th December 1899 he had had a gun-shot wound of the left hand, the bullet, a Mauser one, passing clean through the metacarpo-phalangeal joint of the middle finger. The wound had healed readily, but the injured bones had completely ankylosed, and the whole finger had become absolutely rigid and immovable. About 6 weeks after the wound he observed that the left hand began to feel numb and cold, and to show more or less constantly a bluish colouration. Shortly after he noticed that similar changes were taking place in the right hand. Accordingly he came to the Royal Infirmary.

On admission a condition of intense lividity was recognised in both hands, extending to about a couple of inches above the wrists, the left showing the condition in a more marked form. The scars of the entrance and exit wounds of the bullet were

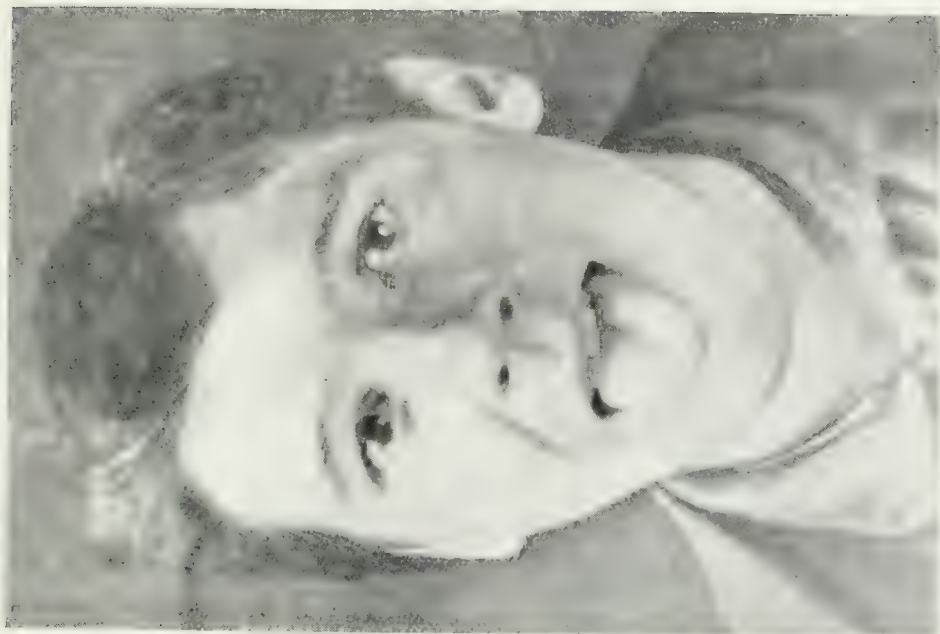


FIG. 1.



FIG. 3.



FIG. 5. JAMES L.—RAYNAUD'S DISEASE.

recognised, and it was evident that in its track and in the parts around there had occurred much fibrous matting of the subcutaneous and deeper tissues. On pressure of the parts from the scars upward towards the wrist some tenderness was elicited, specially on the dorsal aspect. Exposure of the hands to cold aggravated the livid condition, whilst heat, as in the Greville hot-air bath, diminished it somewhat. A drop of blood taken from the finger-tip showed a richness in cells and hæmoglobin above the normal, and repeated examinations of it for organisms gave no result. His urine was absolutely normal, he gave no history of shivering or of hæmoglobinuria, and his physical condition otherwise was absolutely satisfactory.

In the belief that the condition in both hands was the result of irritation of nerves by the cicatricial tissue at the site of the wound, the affected finger was amputated, the cicatricial tissue freely opened and removed, and the nerves exposed and freed. The wound rapidly healed, and aided after a few weeks by the employment of the Greville hot-air apparatus, the lividity and other symptoms rapidly disappeared. He was discharged recovered on 17th August 1900.

The next case was that of a lad of 16, a stable boy, who was admitted to my ward on 23rd January 1896 complaining of a pain in the left foot and of weakness in the legs. He had led a healthy life in the country, his surroundings were favourable, and, except for an attack of measles some years before, followed by swelling of some of his neck glands, he had had no previous illnesses. Of his present condition we obtained the following history :—About the middle of July previously he had received a slight injury to his left tarsus from the hoof of a pony. This occasioned him some pain at the time, but he had forgotten all about it until his attention was called to it by our inquiries. He told us that his present illness had begun suddenly about the middle of the previous September. He was walking home from work one night when he was seized with a pain in the left foot. He was not at the time, nor had he been, exerting himself in any way, but was just walking easily along the road. On arriving home he went straight to bed without examining the foot. Next morning the foot was swollen and painful when he tried to walk. He continued at his work for the next three days, and then as the foot was very painful, and showed no signs of improving, he went to a doctor, who pronounced it to be a severe sprain, and ordered rest and bathing with cold salt water. This treatment was followed for a

fortnight, and then the patient was ordered to exercise the foot. The foot, however, became more painful and swollen, so that even with the aid of two sticks he could not get about, although the swelling greatly disappeared. He then got rest again for 10 days, after which he tried to move about with the assistance of two sticks. After trials of various kinds of treatment he came to the surgical out-patient department of the Infirmary. There no surgical ailment was recognisable, but as the legs showed some atrophy, with markedly exaggerated reflexes and stiffness, he was sent to my medical ward.

On his admission there was marked wasting of the left leg and thigh, the left leg measuring $10\frac{3}{8}$ ins., the right leg $11\frac{3}{8}$ ins., the left thigh measured 16 ins., the right thigh $17\frac{1}{4}$ ins. The interesting point further was that both legs were somewhat rigid, and presented extremely well-marked knee-jerks and ankle and knee clonus.

The legs, indeed, presented a condition very similar to that which follows a transverse myelitis, except, of course, that sensation was not impaired. Eventually, tubercular disease of the tarsus was diagnosed and the foot was amputated, and the important point is that in a very short time afterwards the greatly increased reflexes, clonus, and stiffness had all quite disappeared, and except for the amputated foot the boy was well.

This case, which is one of several very similar cases which I have seen, shows how a focus of irritation situated peripherally can profoundly affect the condition of the trophic centres. There seems to me little doubt that had the focus of irritation in this case not been removable, permanent sclerotic changes in the cord would in time have ensued.

The next case is also a good example of trophic disturbances, but whether in it the injury involved the centres in the spinal cord directly or indirectly it is impossible to say.

A miner, aged 35, was admitted to my ward on 18th May 1901, complaining of stiffness in the back and weakness, and of the presence of little swellings under the skin at various parts of the trunk.

About two months before, whilst working in the mine, bent down on his knees, some hundredweight of coal fell upon the top of him. He was knocked flat, falling, however, on some soft dross which, he said, saved his life. He was unconscious for some time, and was helped home. There he vomited some blood, and next day he had melena. He kept his bed for about two months,

and finding at the end of that time that he was still suffering from great stiffness in the back and weakness, he came to hospital.

On examination we found him a healthy, strong-looking man, of good development and muscularity. His height was 5 ft. 7 ins., weight 12 st. 4 lbs. His temperature, pulse-rate, and digestive system were all practically normal. He presented no enlarged lymphatic glands, and his blood film was normal. As regards his circulatory system, all that was noted was that he found himself to be more short of breath than formerly, and that he had felt inclined to faint several times. The heart was found to present a slight amount of enlargement, with a slight systolic murmur, best heard in the mitral and pulmonary areas. This murmur was believed to be functional.

Nervous System.—He complained of pain and stiffness in the spine, from the cervical to the lower dorsal region, and the vertebral spines were somewhat tender to pressure. He had no girdle pain, and cutaneous sensibility all over seemed unimpaired. He presented no nystagmus, and his special senses showed nothing abnormal. His pupils reacted readily to light and accommodation.

His voluntary motor power seemed to be impaired, specially in the right arm. His plantar, abdominal, and epigastric reflexes were absent. The cremaster was slightly present. His knee and ankle jerks were well marked on both sides, specially on the right. His gait was slow but unimpaired to all appearance, and his equilibration (Romberg's symptom) was normal. His organic reflexes were unimpaired, and his urine presented nothing abnormal. The peculiar trophic disturbances in this case were found in connection with the skin. They showed themselves as little swellings, varying in size from a pea to a somewhat flattened plum. These could be felt in the positions indicated in the annexed diagrams (Figs. 6 and 7).

They were freely movable, felt fairly firm, and were painless on pressure. They had come out ever since the accident, and as far as could be ascertained, from the patient's description and from our own observation, they came out in the order marked in the diagrams. On this point, however, we could not be absolutely certain, but Nos. 6, 7, 8, and 9 were only discovered by the patient or by myself during his period of residence in the Infirmary. The largest of them was No. 2, measuring about 2 ins. from side to side, and about $1\frac{1}{2}$ ins. in its vertical diameter.

A portion of one of them, excised and examined histologically, showed the structure of a lipoma.

After some 4 weeks' residence in the ward this patient left for home *in statu quo*, and I learned that afterwards paralysis and wasting of the muscles of the legs occurred, and that he died after about a year.

In this patient the results of the trauma on the trophic centres in the cord were such as to induce there irritative atrophic and degenerative changes, but the specially interesting feature in the case was the production at the periphery of what were really tumour growths. As already indicated, it

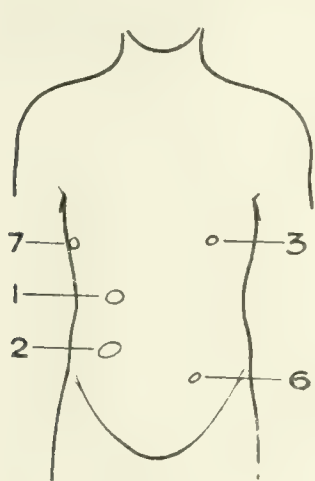


FIG. 6.

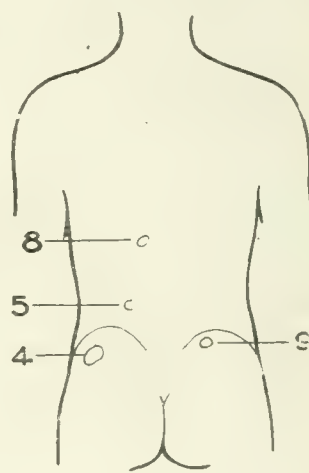


FIG. 7.

is impossible to say whether in such a case the centres in the spinal cord were involved primarily by the trauma or secondarily through the nerve roots or through the results of irritation of the parts around. In passing, therefore, next to the consideration of the effects of concussion or shock on the brain, I shall confine myself in the meantime to instances in which the shock was the result of other than mechanical traumas.

Alexander W., aged 65, a station-master, was admitted 14th September 1900 suffering from paralysis agitans of 4½ years' duration. His family history was good, and though exposed to cold and wet he had led a careful and temperate life. He had had an attack of rheumatism about 20 years before. He dates his condition to a severe shock which he had sustained four and a half years ago. At the station of which he was agent—a junction—two trains, both passenger ones, and going about 30 miles an hour, were about to collide. He saw that this was almost certain to

happen, and ran along the platform and shifted the points just in time to prevent it. At the time he shook very much all over, but after a day or two he thought he was all right, although he still felt somewhat shaky. About a month afterwards, however, numbness and stiffness and shakings in both hands gradually showed themselves, and this condition gradually passed to his legs.

The disease, paralysis agitans, has been aptly termed a 'premature and intense senility,' and taking into account this man's age, the anxious nature of his work, and the fact that he had shown rheumatic symptoms some years before, there is no doubt that the supervention in him of paralysis agitans without any history of shock could not have been considered in any way out of the common. Still he had shown no signs of premature ageing previous to it, and the shock was a profound one, so that it may be regarded as having been a distinctly important factor in bringing on his disease.

Dr. Richard Stern * in his monograph gives two good examples of the effects of psychical brain shock. One of them was a man who was of nervous constitution, and who had received an accident for which an operation under chloroform was required. When he was being prepared for the operation, and before chloroform had been administered at all, he died of heart failure. The second was that of a man who was close to a waggon filled with earth which overturned, burying a comrade in the debris. The man went to the spot and tried with his hands to get away the earth. From the shock and the effort he dropped dead. He had probably, however, had old-standing heart trouble.

In his *Mental Physiology* Carpenter has given some striking examples of the effect of mental shock and of mentalisation on the bodily processes. As examples of the influence of mental shock I quote the two following†:—

(a) "A lady who was watching her little child at play saw a heavy window-sash fall on its hand, cutting off three of the fingers, and she was so much overcome by fright and distress as to be unable to render it any assistance. A surgeon was speedily obtained, who, having dressed the wounds, turned himself to the mother, whom he found seated moaning and complaining of pain in her hand. On examination three fingers, corresponding to

Über traumatische Entstehung innerer Krankheiten, Jena 1907 ("Krankheiten der Kreislauforgane"), pp. 120 and 145.

† Carpenter's *Mental Physiology*, p. 682.

those injured in the child, were found to be swollen and inflamed, although they had ailed nothing prior to the accident. In 24 hours incisions were made into them, and pus was evacuated; sloughs were afterwards discharged, and the wounds ultimately healed."

(b) "A highly intelligent lady, known to Dr. Tuke, related to him that one day she was walking past a public institution and observed a child, in whom she was particularly interested, coming out through an iron gate. She saw that he let go the gate after opening it, and that it seemed likely to close upon him, and concluded that it would do so with such force as to crush the ankle; however this did not happen. "It was impossible," she says, "by word or act to be quick enough to meet the supposed emergency, and in fact I found I could not move, for such intense pain came on in the ankle, corresponding to the one which I thought the boy would have injured, that I could only put my hand on it to lessen its extreme painfulness. I am sure I did not move so as to strain or sprain it. The walk home—a distance of about a quarter of a mile—was very laborious, and on taking off my stocking I found a circle round the ankle, as if it had been painted with red currant juice, with a large spot of the same on the outer part. By morning the whole foot was inflamed, and I was a prisoner to my bed many days."

Every physician of experience recognises the powerful influence of the mental condition on the organic functions, and there are few such who cannot call to mind instances of how the course, favourable or unfavourable, of a disease has to all appearance been governed by the mental condition of the patient. But physicians every now and again see instances of disease in which no other conclusion can be arrived at than that it is simply the result of morbid mental conditions. As Carpenter has pointed out, the self-tormenting hypochondriac will imagine himself the victim of any malady that he may fancy, and if this fancy should be sufficiently persistent and engrossing it is not unlikely to lead to real disease of the organ to which it relates.

It follows, therefore, that as it is one of the duties of the doctor to indicate precisely the part played by trauma in causing disease, the doctor must, in any given case, not only know the nature and severity of the accident, and must make himself acquainted with the patient's heredity, constitution, habits, circumstances, and previous health, but he must also take count of the patient's mental attitude. In these days an accident is too apt to be, in

one of its aspects, simply a commercial asset, to be negotiated with to the last shilling, and there is no doubt that even the average man, in his perhaps natural anxiety to negotiate to the best advantage, may by thinking too much on his symptoms do himself infinitely more harm than the accident itself could ever have done.

It further follows, therefore, that in the study of the subject of trauma and disease an approach to it from the point of view of disease presents advantages which an approach from the trauma aspect cannot offer.

CLINICAL RECORDS.

A CASE OF CONGENITAL ABSENCE OF THE CHONDRO-STERNAL PORTION OF THE PECTORALIS MAJOR.

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THE lad depicted in the accompanying figure is 14 years of age. Except for the congenital deformity he is healthy and well developed. He is an only child of parents who, if above the intellectual average, may present perhaps a tendency towards neurotic temperaments. Though robust and strong he is of slight build, with a mental development in many ways quite exceptional and in certain directions brilliant. He has had no illnesses since childhood, and is active and athletic, a lover of games as well as of books. When stripped, his defect is very striking. The right side of the chest is normal and well developed ; the left side, in its upper half in front, is somewhat flattened, and it is at once obvious that the costo-sternal portion of the pectoralis major is absent. The nipple, with normal areola, and the breast are present. The anterior axillary fold is represented by a double layer of skin forming a free and sickle-shaped margin from the anterior extremity of the fourth rib to about the middle of the inner surface of the arm. It is made up of two folds of skin enclosing some superficial fascia and areolar tissue, but apparently quite devoid of muscular fibres. There is a distinct clavicular portion of the major pectoral muscle, normally developed and under normal control.

Examination of the underlying costal cartilages shows a distinct defect in the second and third. Indeed the second costal cartilage appears to be entirely absent, and there is a distance of an inch and a half or thereabouts between it and the margin of the sternum. The third costal cartilage is also obviously deficient but not quite to the same extent, and it is possible that there may be a slight defect in the fourth, but that is difficult to be sure about. A slight sinking in of the chest wall in the neighbourhood of the second and third costal cartilages affords ocular evidence of the subjacent defect. As might be expected, a radiogram of the parts is somewhat disappointing. The shadows cast by the ribs are distinct enough, but the defect as disclosed by digital examination is confirmed somewhat indistinctly by the radiogram, because only the cartilages are involved, and scarcely, if at all, the osseous portion of any rib.

It is seventeen years since Dr. John Thomson gathered together the cases of this deformity scattered throughout antecedent literature, and



CONGENITAL ABSENCE OF CHONDRO-STERNAL PORTION OF LEFT PECTORALIS MAJOR IN A LAD AGED 14 YEARS.

his communication is still the premier one in this country. Of it Ballantyne⁷ writes—"Although many papers (on the subject) have appeared since its publication, these have not altered the conclusions contained in it." The absence of the chondrosternal portion of the pectoralis major has been noted on many occasions. It is not uncommonly associated with absence of the breast and nipple¹ on the affected side, and sometimes with defect in the growth of ribs. The entire muscle, including its clavicular portion, may be wanting, and the pectoralis minor also may be absent. The defect in the ribs may be of the slightest, while in other cases it is more extensive. Ribs not entirely absent are defective in their anterior parts, and most often merely in their cartilages. The alteration from the normal may be very slight indeed, as when one or more cartilages may be felt attenuated or abnormally approximated. Thus Carter² noted in a boy of 13 years that the absence of the sternal portion of the pectoralis major was accompanied by the absence of three-quarters of an inch of the third costal cartilage. The cartilages and a considerable portion of the 3rd and 4th ribs were absent in Levy's case.³ In the case of a boy aged 12 years recorded by Jefferiss⁴ the defect of the 3rd and 4th ribs was even more extensive. In this case, as often happens, the defective ribs appear to fuse at their anterior extremities with those next them, and the area of deficiency is closed by "a firm yielding fascia-like structure made up of tense vertical bands." It is interesting that this fascia is able to prevent visceral hernia, at any rate in the thorax. A drawing-in of the chest wall where the defect is may be noticed in inspiration, but no extrusion of viscus occurs on forced expiration, as in straining on exertion. When an equal defect occurs in the lower series of ribs the absence of hernial protrusions is not so invariable. Murray⁵ has reported the case of a boy of 5 years in whom there was complete absence of the left 8th, 9th, and 10th ribs, and through this two-and-a-half-inch space in the thoracic wall the spleen could be felt and was protruded when the child coughed, while Young⁶ recorded a very similar case where a "large hernial protrusion" took place at the site of a congenitally absent 9th left rib. Where hernia occurs in the upper part of the thoracic wall it is in association, not with simple absence of muscle or of muscle and partial defect of ribs, but as an accompaniment of a much more gross congenital deformity, as in pleurosomus.

References.—¹ Thomson, A., "On a Form of Congenital Thoracic Deformity," *Transactions, Edinburgh*, 1857, pt. II, p. 1. ² Carter, D. H. *Lancet*, London, 1884, pt. II, p. 308. ³ Levy, A. G., *Ann. Med. Assoc.*, 1884, pt. I, p. 1459. ⁴ Jefferiss, F. B., "A case of Incomplete Development of the 3rd and 4th Ribs," *Lancet*, London, 1900, p. 1437. ⁵ Murray, A., "A Case of Deficiency of Ribs," *Proc. Soc. Trans.*, London, vol. xix, p. 212. ⁶ Young, J., *Trans. Med. Assoc. Scot.*, Edinburgh, 1887, vol. 10. ⁷ Ballantyne, J. W., *Manual of Anatomical Pathology and Hygiene*, Edinburgh, 1904.

CASE OF FIBROID OF UTERUS (SHOWING UNUSUAL FORM OF CYSTIC CHANGE), REMOVED BY SUPRAVAGINAL HYSTERECTOMY, WHERE SEVERE POST-OPERATIVE HÆMORRHAGE OCCURRED FROM A CORPUS LUTEUM, NECESSITATING REOPENING OF THE ABDOMEN AND REMOVAL OF THE OVARY.

By JAMES HAIG FERGUSON, M.D., F.R.C.P., F.R.C.S.,
President of the Edinburgh Obstetrical Society.

THE following case of severe intra-peritoneal hæmorrhage from a corpus luteum is of considerable interest at this time, as gynæcologists are now again recognising that bleeding into the pelvis may be due to other causes than rupture of an ectopic pregnancy. I am inclined, from my experience in abdominal surgery, to think that a certain degree of hæmorrhage into the peritoneal cavity, ovarian in origin, is by no means an uncommon occurrence at the menstrual periods, and that it may in some cases partly account for the pelvic pain often associated with the catamenia.

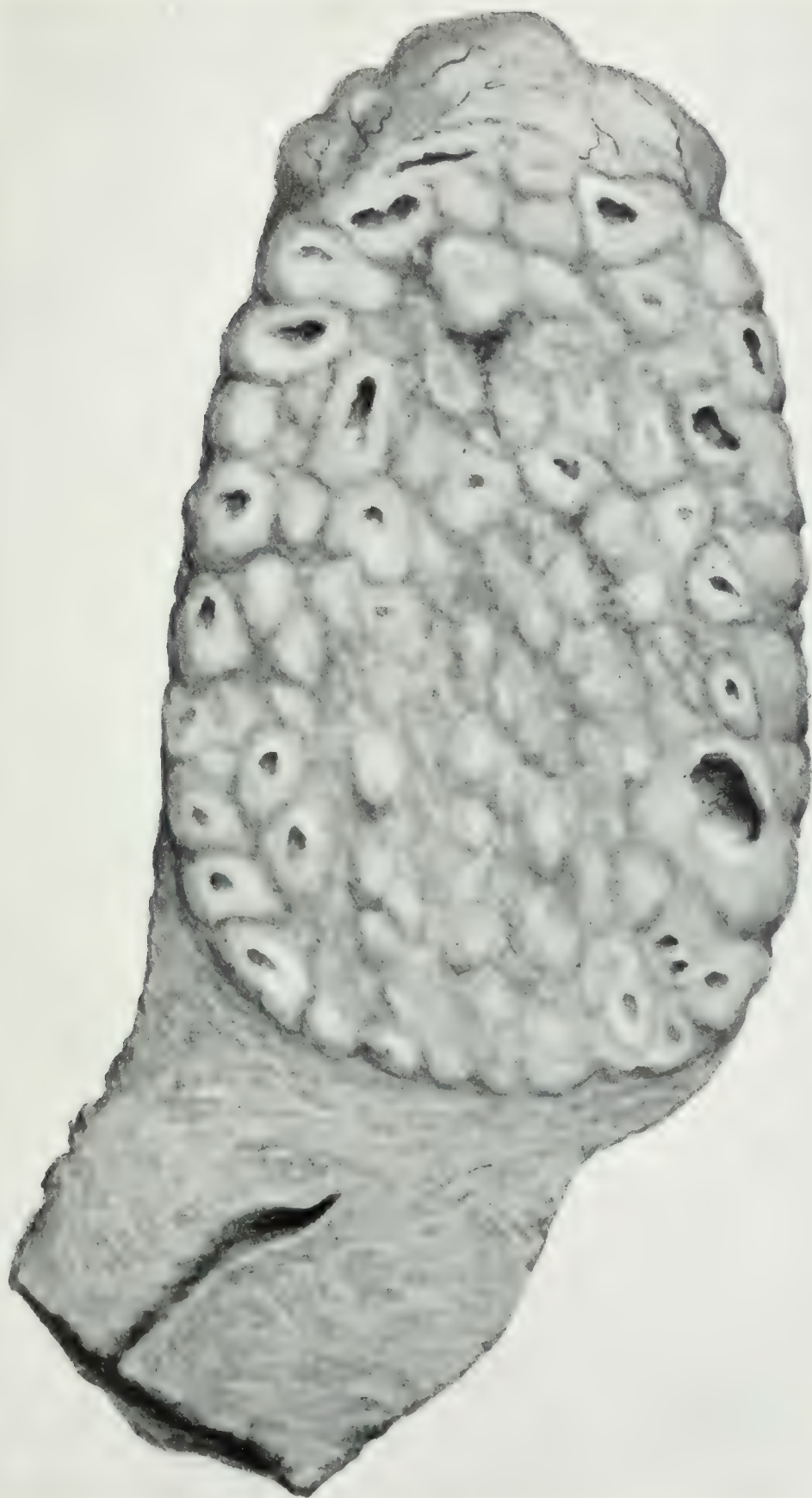
Cases have been recorded of severe pelvic hæmorrhage from rupture of small blood cysts or hæmatomata of the ovary (occurring in sclerocystic degeneration of the ovary), and even apparently from fairly normal ovaries at the menstrual periods (Spencer, Lockyer), not to speak of the possibility of hæmorrhage from the non-pregnant tubes themselves. A ruptured vessel on the surface of a uterine fibroid has been observed more than once as a cause of pelvic hæmorrhage, and these do not exhaust the possible sources of such bleeding, apart altogether from extra-uterine gestation. The case I am about to record is, however, of special interest to the abdominal surgeon as revealing a source of post-operative intra-peritoneal hæmorrhage which hitherto has been practically unconsidered. Fortunately it must be very rare, at least to the extent of producing serious manifestations. The case is as follows:—

Mrs. D., æt. 37, recommended to my care by Dr. John Cumming, and admitted to Nursing Home 23rd October 1912. Nine months previously the patient first noticed a firm swelling in the lower part of the abdomen, which has been steadily enlarging. Associated with the swelling there has been almost constant discomfort and a feeling of heaviness. There was no actual pain unless the tumour was pressed upon.

Pregnancies.—Two children; 16 and 12 years old respectively.

Menstrual History.—Regular, no menorrhagia or metrorrhagia. Severe pain in the lower abdomen while the flow lasted.

For the past 12 years there has been prolapse of the vaginal walls and cystocele.



DR. HAIG FERGUSON'S CASE OF CYSTIC UTERINE FIBROID.

There is no evidence of hæmophilia.

Diagnosis.—Soft fibromyoma of uterus the size of a foetal head, probably undergoing cystic degeneration.

Operation on 26th October 1911.—I removed the tumour by supra-vaginal hysterectomy. The operation was a simple one. Both ovaries and tubes were left behind as they were quite healthy. At the time of the operation a large corpus luteum was noticed on the surface of the right ovary and I called attention to it merely as a point of interest.

The fibroid tumour on section was found to be made up of innumerable small fibroids, many of which had a focus of mucoid degeneration in the centre (Fig. 1). It grew from the fundus uteri, and spread out laterally in the abdomen. There was no malignancy.

The operation was performed at 9.30 A.M., the patient was back in bed soon after 10, with a quiet pulse of about 80. She lost very little blood at the operation. Her condition remained quite satisfactory till 5 P.M. when the nurse noted she looked very pale. The pulse was then 90, and the nurse thought the pallor was due to some post-operative shock.

At 7 P.M. (evening of the same day) the nurse noticed that the pulse was above 100. At 8.30 P.M. the pulse had risen to 130 and was very weak—at times it was almost uncountable. The pallor of the face and conjunctivæ had increased and the respirations had become rapid and sighing. The patient was mentally bright, and all the symptoms pointed to intra-abdominal hæmorrhage. The abdomen was rigid but not visibly distended—the rigidity was in part of course accounted for by the presence of the wound. There was some dulness in the flanks. The source of the hæmorrhage was obscure, as all the ligatured vessels were retro-peritoneal. At 9 P.M. a little chloroform was administered and I proceeded to reopen the abdomen. Before beginning, a cannula was introduced by Dr. Young into the right median cephalic vein, and during the operation two pints of saline fluid were slowly poured into the circulation.

On opening the wound a large quantity of clotted and fluid blood was found in the abdominal cavity. On clearing the most of it out to permit an examination of the pelvis, I found that the source of the hæmorrhage was the ruptured corpus luteum on the surface of the right ovary. I quickly removed the ovary and tube, cleared out as much as possible of the extravasated blood, and hurriedly closed the abdomen, after leaving a couple of pints of saline in the peritoneal cavity. In the earlier part of the operation the patient was pulseless, and her condition gave rise to grave anxiety. Thanks to the saline infusion, however, the pulse became more and more perceptible, and by the end of the operation it was down to 120, though still weak. During the night it steadily gained in strength, and the patient made a steady, rapid and uneventful recovery.

It seems certain that the hæmorrhage in this case, which must be recognised as one of unusual interest and importance, had come from the corpus luteum, which had probably been bruised during the handling at the first operation in the morning. It is unlikely that it was ruptured completely at the first operation, as had that been the case the hæmorrhage which it subsequently showed itself capable of giving rise to, would probably have been noted at the end of the operation. It is likely that the bruising gave rise to hæmorrhage into the substance of the corpus luteum, followed in the course of the day by a giving way of the overlying ovarian tissue. The distal vessels on the uterine side of the ovary had been of course tied, while the ovarian artery on the proximal side, continuing to pump blood into the ovary, doubtless brought about a condition of temporary circulatory disturbance in the gland itself.

Examination of the ovary after removal showed the corpus luteum to be so soft that it crumbled away in the fingers with the least pressure. At the time of the second (emergency) operation there was only a gentle ooze from its surface, which no doubt was accounted for by the collapsed state of the circulation from the loss of blood. The ovary was otherwise healthy.

This case shows that in certain circumstances a corpus luteum may be a source of danger after hysterectomy. With the experience thus gained I should hesitate, after hysterectomy, to leave an ovary behind with a distinct corpus luteum. Probably the simplest plan would be to remove it, but if the other ovary were diseased, and it was desirable to leave the ovary containing the corpus luteum, one could either resect the ovary or, preferably, ligature the ovarian artery in the infundibulopelvic ligament. Recent experience seems to show that a resected ovary is apt to become cystic and call eventually for further operative interference.

Jayle believes that hæmorrhagic ovaritis is a bilateral condition, and advises that when a hæmorrhagic cyst of one ovary is discovered the opposite ovary should also be removed, unless there is some very definite contra-indication. He describes a case where he removed an ovary and uterus for a fibroid. The ovary was somewhat sclerosed and contained a blood cyst. A year later the patient was operated on for the cure of a ventral hernia; free blood was found in the peritoneal cavity, the source of which was a ruptured cyst in the remaining ovary which had obviously ruptured during the examination before the operation. I would emphasise, however, that in my case the condition was not one of hæmorrhagic ovaritis, but merely hæmorrhage from a bruised corpus luteum in an otherwise apparently normal ovary.

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CASE OF MULTIPLE FIBROIDS COMPLICATING PREGNANCY: REMOVAL OF SUBPERITONEAL TWISTED FIBROID AT FIFTH MONTH; CÆSAREAN SECTION AT TERM; TWINS; SUPRAVAGINAL HYSTERECTOMY; RECOVERY OF MOTHER AND CHILDREN.

By E. SCOTT CARMICHAEL, M.B., F.R.C.S.,
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Women, Edinburgh.

MRS. L., æt. 42, a primipara, married for six years without pregnancy or miscarriage, was seen in consultation with Dr. Gardner, Leith, suffering from painful swelling in abdomen on 25th October 1911. The pain was so severe that both the patient and her husband desired something for its relief.

On examination, the patient being five months pregnant, a mobile hard swelling the size of an apple and extremely tender was felt on the left side of the abdomen about the level of the umbilicus, attached to, but freely mobile upon, the uterus.

A second swelling, the size of a large orange, was made out in the hypogastric region, occupying the lower uterine segment and encroaching upon the cervix, as felt *per vaginam*.

Operation was recommended, and a small twisted fibroid was removed by laparotomy, but as the patient was extremely anxious to have a child, pregnancy was permitted to go on, the patient recovering well from the laparotomy.

On 2nd February 1912, about the 8½ month, last menstrual period having been 12th May 1911, the abdomen was opened by a six-inch incision. The uterus was incised longitudinally within the abdomen. The placenta were situated on the left anterior uterine wall. Binovular male twins were removed. The placenta were also removed, and the uterus then brought out through the abdominal wound and removed along with the tubes and ovaries by the supravaginal method. The twins were healthy and revived immediately. The abdomen was closed without drainage, the patient made an uninterrupted recovery, and has nursed one of the twins most satisfactorily.

The chief points of interest in this case are:—(1) The age of the patient and the long period of sterility previous to the pregnancy; (2) the advisability of allowing the pregnancy to go on to full term after removal of the subperitoneal fibroid; (3) the small incision made, and removal of the uterine contents within the abdomen; (4) supra-

vaginal hysterectomy at term, a relatively easy and safe operation; (5) the presence of twins. These were situated left and right. The right twin presented by the breech and was delivered last. The left twin presented by the head, which lay in the lap of the other child, and was delivered first. Had delivery taken place *per vias naturales* the order of birth would have been reversed. The weight of the twins was 5 and 4½ pounds respectively.

Lord Lister.

LISTER is dead !

A sigh seems to whisper round the living world, the living world which owes so much to him and which knows so little of him. It is we who sigh, wherever our place may be throughout the world, we who fight with disease and death, for we realise that a great and inspired Presence has passed from earth.

“ But, O, the heavy change, now thou art gone ! ”

We knew our loss was imminent. We had noted the advance of age and infirmity, the gradual withdrawal from the activities of life and the beloved fields of study. We were prepared for the retirement and seclusion. Our hearts yearned toward him when we learned that now he only rose from his bed occasionally, and sat at the window to watch the setting sun. How we longed to see him, to say a cheering word, to tell him again how much we owed to him. And now, sight grows dim, hearing is dulled, conversation is a burden. And now he is gone. Lister is dead. Yet in our sigh of heartfelt sorrow there is a feeling of relief, for distress and weariness are past, and the long vigil ended. Yes ! happy the death when work is done.

It is interesting to note the various circumstances that determined the direction of Lister's studies and equipped him for his life work. He came of healthy and vigorous stock. He inherited scientific tastes and a love for nature. He was brought up in a society which set the highest value on moral qualities, truthfulness, simplicity, earnestness. His education was thorough and liberal, both on the classical and scientific sides. As a boy he was trained to observe minutely and to record accurately, and he was early accustomed to the use of the microscope. His acquaintance with French and German gave him access at first hand to the records of original work in these countries. He was fortunate in his teachers, fortunate, too, in his early introduction to the clinical methods of the Edinburgh school and the salutary simplicity of Syme.

He was fortunate in his personal characteristics. He had an un-



John Thinks

George Hogarth Pringle

Patrick Heron Watson

Alexander Struthers

John Beddoe

Lister

David Christison

RESIDENTS IN THE ROYAL INFIRMARY, EDINBURGH, IN 1855.



LISTER IN 1869, WHEN HE BECAME PROFESSOR OF CLINICAL SURGERY
IN THE UNIVERSITY OF EDINBURGH



[Photo by Pearson, Edinburgh.]

LISTER IN 1877, WHEN HE RESIGNED THE CHAIR OF CLINICAL SURGERY
IN EDINBURGH.

usually handsome presence, and his strikingly attractive face was but the mirror of a calm, gentle, earnest, kindly spirit.

“Soft lines of tranquil thought his face fulfil,
His face at once benign and proud and shy.”

No words could be better chosen than those of Henley. There was something in that benign face strangely reminiscent of a shy and sensitive child. Transparent clearness, simplicity and directness characterised his thought and speech.

To write an appreciation of Lister is a difficult task. For though a generation has passed since the world acclaimed him as a great benefactor, we are perhaps still too near to appreciate his figure in its true perspective.

Of the ultimate verdict on his life and work we have no doubt, and we are content to leave that to the arbitrament of time and right reason. Meanwhile, love and loyalty and reverence for our great Teacher call us to proclaim our estimate. We claim for him a place among the great masters of thought. Apart from the wonderful insight and ability displayed in his elaboration of antiseptic surgery, his earlier researches in physiology and pathology show genius of the highest order. The papers on the early stages of inflammation, on the nervous system, and on the coagulation of the blood establish fundamental principles, and we would class them with the *Principia* of Newton. We do not hold with the dictum that genius is merely the capacity for taking pains, but if this gift were the pass to the hierarchy of genius, then assuredly it would admit Lister, for his capacity for taking pains was almost incredible. The same quality of thought and closeness of attention which were brought to bear on the weighty and sometimes appalling problems of surgery were bestowed on the smallest details, even to the proper fastening of a safety-pin in a dressing. His constant study of the infinitely little may have strengthened his conscientious care of what to many seemed trifles. But there was much more than tireless and laborious exactitude. In the planning of his experiments and in his interpretation of results we have to admit the presence of that indefinable quality of intuition, the prescient eye, the inward light, which mark the man of genius.

If we turn our eyes from the purely intellectual qualities of this great man and consider his personal character we find a wholly noble, dignified, unselfish nature. Perhaps the outstanding feature of Lister's character was his humanity. He was not led to his epoch-making work by purely intellectual aims or a natural love of investigation, but he was prompted to it by his deep sympathy with suffering and his innate kindness of heart. This tenderness was noticeable in his dealings with his hospital patients, and did not escape the sharp eye of a

street arab in the Royal Infirmary, whom we heard say, "He likes the little yins best, and the auld women." He had no taint of selfishness. His reiterated acknowledgments of his debt to his friend Pasteur are well known. We remember the eager enthusiasm with which he told us of Koch's brilliant idea of solid culture media.

In the early years of his work in antiseptic surgery his sensitive spirit was often wounded by the apathy, the opposition, the misrepresentation with which his views were met. But even when opponents descended to unworthy insinuation he replied with dignity and without resentment.

Nothing was more impressive in the character of this truly great man than his simple unaffected modesty. He was the acknowledged master in his own domain, but he was open to suggestion and to criticism. It would be a hard thing for most men to give up a method developed at great cost of time and labour, with which their names were associated, and which, in the view of many, had made them famous. But when Lister became convinced that the advance of science had proved the carbolic spray was unnecessary he was one of the first to give up its use.

When careful observation and repeated experiment had given him confidence he spoke with conviction and earnestness. The following quotation from one of his addresses illustrates at once his earnestness and his moderation in scientific statement:—"I felt it was my duty to speak what I believe to be the truth, for I feel it to be a grievous thing that patients should be hurried out of their lives or deprived of usefulness of limb simply for want of sufficient earnestness with regard to the endeavour to obtain complete exclusion of septic agencies from wounds, according to our present lights and our present knowledge."

From time to time discussions arise as to who is the greatest man. It is impossible to expect that the world can agree on this, because the ideas of men vary as to what constitutes greatness. But if the question is, who of men has done most for his fellow-men, who has been the greatest benefactor, there can be only one answer. God, the All-giver, gave this supreme honour to Joseph Lister. What discovery in science or philosophy has done for the human race what Lister has done? We honour the soldier. We cannot do enough for him who by his skill, his endurance, his courage, has driven off the invader and saved his country. But he has fought only for his own dear land. The poets and philosophers who have given us great thoughts and ideals and set us in an ampler air—we cannot repay them. But they have sung and spoken for certain classes or certain epochs; millions there are who can never enter into their thoughts. The inventors and discoverers have laid us under great obligations for making life easier, more comfortable, more happy.

But all sorts and conditions of men, in every land, and from now to the end of time have an interest in the work of Lister. Barely thirty years have passed since Lister revolutionised surgery, and it is not an exaggeration to say that in civilised lands, where modern surgery exists, there are few individuals who have not either in themselves or in the immediate circle of their friends and relatives, been benefited by Lister's work. The world owes much to Pasteur, more than to any man before him. Without Pasteur, Lister's work had not been. But it was Lister who applied the knowledge directly to the service of man. Pasteur's researches on fermentation, on anthrax, on pebrine, were of invaluable assistance to the vineyards, the flocks, the silk industry of France. But life is more than meat and the body than raiment, and we think Pasteur's supreme merit lies in having equipped Lister.

If we were to say Pasteur had forged the sword with which Lister conquered, we fear our figure might have brought a gently reproving smile from him who owed so much of the charm and strength of his character to the Society of Friends. Let us say rather that Pasteur gave Lister the key to unlock the iron door. This key was the germ theory. But even with the key, the work was hard, for the combination of the lock had to be learned.

The influence of Lister's personality on his pupils was very great. It is difficult to express it in words. There are men all over the world to-day who consider it their highest honour that they have been pupils of Lister, and have worked with him, who comfort themselves in dark days with the thought that they realised they were in contact with genius, and that their prophetic souls saw the new era dawning.

None of us who experienced this magic touch, who felt the stimulus of that great, earnest, beneficent spirit, can think of it as something lost; the thought of him, and what he was, gives an impression of perpetuity, and forbids us to believe that death ends all.

Neither was it his belief. No survey of Lister's life would be complete or honest which failed to refer to his attitude towards the great problems of existence, to Life and Death and After. His attitude to these questions, like that of Newton and of Pasteur, and of others whose genius has plumbed the abysses of being or "outsoared the shadow of our night," was one of childlike humility and confidence. He still looked to things eternal and walked humbly with his God. He held the blessed hope of everlasting life, and believed in a happiness beyond the grave. LISTER IS NOT DEAD. J. S.

LISTER'S FELLOW RESIDENTS.

JOHN BEDDOE, M.D.(Edin.) (1853), LL.D., F.R.S. The celebrated Ethnologist. Author of *The Races of Britain* (1885). Twice President of the Anthro-

pological Society. Served in the Crimean War as Assistant-Physician in the Civil Hospital at Renkeui, Dardanelles.

DAVID CHRISTISON, M.D.(Edin.) (1851), LL.D. A distinguished Antiquarian. Secretary and Vice-President of the Society of Antiquaries, Scotland. Served in the Crimean War as Assistant-Physician in the Civil Hospital at Renkeui.

SIR JOHN KIRK, G.C.M.G., K.C.B., F.R.S., M.D.(Edin.) (1854), LL.D.(Edin.), D.Sc.(Camb.), D.C.L.(Ox.). Served in the Crimean War with Beddoe and Christison. Was Chief Officer and Naturalist in Livingstone's Zambesi expedition. Subsequently H.M. Political Agent and Consul-General at Zanzibar; British Plenipotentiary at Brussels to African Conference, 1889-90; H.M. Special Commissioner to Niger Coast, 1895, etc.

GEORGE HOGARTH PRINGLE.

Settled in Australia, and died many years ago.

ALEXANDER STRUTHERS. Died of fever while serving in the Crimean War as Staff Assistant Surgeon at Scutari.

SIR PATRICK HERON WATSON, M.D.(Edin.) (1853), LL.D. Surgeon to the Royal Infirmary, Edinburgh; twice President of the Royal College of Surgeons, Edinburgh; Honorary Surgeon to the King in Scotland. Served in the Crimean War with the Royal Artillery.

MEETINGS OF SOCIETIES.

Edinburgh Medico-Chirurgical Society.

A MEETING was held on 7th February, Mr. J. M. Cotterill in the chair.

Mr. Struthers (for Mr. Cathcart) showed—(1) A patient after removal of a calculus from low down in the ureter. The position of the stone was revealed by an X-ray photograph. The ureter was exposed by an extra-peritoneal operation, and the ureter was opened above the brim of the pelvis. The stone was removed with the help of a loop of copper wire mounted on a handle. (2) A man in course of recovery after operation for musculo-spiral paralysis. The humerus had been fractured, and at the operation the nerve was found stretched over the end of the upper fragment and embedded in callus. The nerve was freed and the fracture wired.

Dr. Fraser (for Dr. Gulland) showed an untreated case of myxœdema and a case of tabes dorsalis in a woman aged 53. In the latter there was no history of syphilis, and the Wassermann reaction was negative. There was paresis of both third nerves and hemiatrophy of the tongue. An injection of salvarsan was followed by great improvement in these symptoms, but the tabetic symptoms remained unaltered.

Professor Caird showed a man after operation for entero-vesical fistula, due to cancer of the sigmoid involving the bladder. Enterectomy was performed; the tumour was then removed from the bladder wall, which was sutured. End-to-end anastomosis of the bowel was carried out, and to avoid

risk of any tension a catheter was tied into the bladder and appendicostomy was performed.

Dr. Cranston Low showed a case of xanthoma. On various parts of the body there were symmetrical tumours showing a yellow centre and a red border. One of the tumours had been removed two years previously without recurrence. It consisted mainly of connective tissue cells and yellow pigment. The latter was the fatty acid ester of cholesterin.

Professor Caird read a paper on the "Treatment of Tuberculous Peritonitis in Adults by Operation," which will appear in the *Journal*.

The President asked whether Mr. Caird would deliberately open a dry case without special indication. The usual teaching was that great care was required in dealing with such cases. Sir James Attleck said that medical measures should have a fair trial before operation was undertaken. His cases under 12 years of age had not done so well as the older ones. Where the peritonitis was associated with disease of the mucous membrane surgery did not do so much good. In his experience the cases with exudation did better after operation than the dry ones. Mr. Wallace advocated early operation. There was more chance at an early stage of finding the primary focus of infection, and cases in which it was removed were more favourable. Adhesive cases without fluid did better than the exudation cases. In the latter the operation was more difficult. Faecal fistula might occur as long as ten days after the operation, but even these cases might do quite well. Mr. Stiles said he had experienced the same difficulty as Professor Caird in distinguishing between tuberculous and malignant cases. It would be of interest to know whether the cases with lung and other complications were human or bovine tubercle. In children the dry cases and cases with enlarged glands gave by far the best results. Acute cases with fluid, especially if there were diarrhoea, were unsuitable for operation. In dry cases operation often turned the scale in the direction of recovery. Mr. Scott Carmichael said he regarded cases of infection of the female genital organs as secondary to the peritonitis and not primary. It seemed likely that the dry forms of tuberculous peritonitis represented a stage in the process of cure. In any case they gave better results than the acute cases with fluid. Dr. Russell said he was glad to learn that surgeons were prepared to operate on dry cases. In the light of Mr. Caird's results the surgeon could evidently effect a quicker cure than the physician. He was doubtful of the existence of a primary focus in many cases. There might be an infection through the intestinal wall. Mr. Miles pointed out that in the dry form operative recoveries might be more numerous since so little was done. In the fluid cases more was attempted, and operation recovery might not be so good. More information was required regarding ultimate recoveries.

Drs. Hope Fowler and W. T. Ritchie gave a communication on "Ortho-Röntgenography of the Heart and Aorta," which will appear in the *Journal*. The outline of the heart and large vessels was shown in a large number of pathological conditions, and a comparison with results obtained by percussion was given.

Dr. Russell claimed that the skilled physician could determine the outline of the heart as accurately by percussion as by means of the orthodiascope. The right border was always to the right of the border of the sternum. Dr. Rainy said that this method gave an accurate silhouette of the heart.

The difficulty with percussion was that the sound was not propagated at right angles to the surface but in circles. The difficulty therefore increased with the depth of the organ percussed.

Forfarshire Medical Association.

A MEETING of the Forfarshire Medical Association was held on 1st February, Dr. Angus MacGillivray in the chair.

Dr. Foggie showed photographs of a boy with extensive *psoriasis* of the circinate type.

Dr. J. Mackie Whyte showed specimens from a case of *aneurysm of the aorta* which had been under treatment for four years. The whole arch of the aorta was affected, while in addition there was a saccular projection which had eroded the manubrium.

Dr. Pirie showed a series of X-ray photographs of a case of *aneurysm of the aorta* undergoing treatment.

Professor Kynoch demonstrated a specimen of *hæmatometra* in a large fibroid, the result of complete torsion of the uterus and its appendages.

Dr. D. Rutherford Dow showed a *placenta, with microscope slides*. The mother had had five miscarriages, while the foetus weighed 4½ pounds and was 16 inches long. One half of the placenta was normal, but the other half was thin, white, dense, and fibrous. This latter portion showed on microscopic examination "coagulation-necrosis" brought about by endarteritis and periarteritis in the vessels of the chorionic villi while the artery leaving the cord to the placenta showed marked thickening of its wall and contained a thrombus. Dr. Dow also exhibited a specimen of foetal eventration with other deformities. The foetus presented as a breech, and the abdominal viscera were felt protruding. The upper part of the body was normal. The abdominal wall was open from the ensiform cartilage to the pubes. There was lordosis with spina bifida in the sacral region. The bones of the lower extremities were stunted. X-ray examination showed that there were no fibulae. The right foot was joined to the spina bifida by a broad band of tissue which contained cartilage.

Dr. MacGillivray read a paper on the "Etiology of Phlyctenular Affections of the Eye." He described a phlyctenule as being always solid, consisting principally of a round-celled infiltration with polymorphonuclear leucocytes. Caseation is never seen, but large cells occur which resemble giant-cells, but are not of the true Langhans' type. Vascular dilatation is also present. Healing follows with granulation tissue consisting of spindle-shaped cells, and epithelium grows over the surface. Gifford in 1886 had described staphylococci as being the causal agents, but the more recent work of Axenfeld and others tended to show that phlyctenules were bacteriologically negative. Dr. MacGillivray confirmed this, for in 85 per cent. of cases occurring in Dundee no bacteria could be found, even although the discharge looked purulent in some cases. In 1906, Nias and Paton demonstrated that the opsonic index of patients suffering from phlyctenules was lowered for the tubercle bacillus, while the index rose as the lesion improved. A phlyctenule might therefore be regarded as caused by attenuated or dead tubercle bacilli. Again, under tuberculin treatment phlyctenules frequently made their

appearance. In 1901 Leber excised phlyctenules completely, and had prepared sections from them. No tubercle bacilli were found in these. Efforts to produce phlyctenules by injecting killed tubercle bacilli were unsuccessful. From 6th June 1911 Dr. MacGillivray had examined with von Pirquet's cutaneous method 90 successive cases of phlyctenules; 98·5 per cent. of these gave a positive reaction. Taking all the available information into account phlyctenules might be regarded as a toxic tuberculide, a theory which is quite reasonable in the light of recent bacteriological research, especially when taken in conjunction with the family history, physiognomy, and other collateral evidence observed clinically.

Dr. Mackie Whyte, Dr. Colman, and Dr. Foggie took part in the discussion, and Dr. MacGillivray in replying said that even if it were allowed that the von Pirquet test was not infallible, still the presence of phlyctenules in children ought to put the physician on his guard respecting a tuberculous diathesis.

Dr. G. N. Anderson described a case of *fibroid of the uterus complicating pregnancy* at the 5th month. A cœliotomy was performed with a view to myomectomy, but owing to the multiple nature of the fibroids and their situation, hysterectomy had to be done, with removal of the left tube and ovary. There was a marginal placenta prævia, with several of the smaller fibroids situated on its area of attachment.

Dr. G. Leggat read a paper on a case of "Congenital Absence of Vagina and Uterus." In April 1911 the patient had been in hospital under the care of Dr Buist, who had ascertained the presence of the above condition. She was readmitted with a diagnosis of "hæmatometra" on 8th September. The pain she had complained of previously had returned, and there was an abdominal swelling of six weeks' duration, which was increasing in size. The history of primary amenorrhœa and the swelling seemed to indicate hæmatometra, but this could not be reconciled with the result of the previous examination. Dr. Buist performed cœliotomy and a large cystic tumour was found which contained a quantity of creamy pus like material, with cells with fragmented nuclei, while no result was obtained from inoculations on culture tubes. The cyst had no connection with the pelvis or the neighbouring bones, and was probably of lymphatic origin. Its walls were stitched to the abdominal wall and the cavity was drained thus to the exterior. It discharged for about a fortnight, healed up, and the patient was dismissed on 20th October.

Edinburgh Obstetrical Society.

THE fourth meeting of the session was held on 14th February, Dr. Haig Ferguson, President, in the chair.

Specimens were exhibited by Mr. Brewis, Dr. W. Fordyce, Mr. E. Scott Carmichael, Dr. B. P. Watson, and Dr. James Young.

Sir Halliday Croom communicated a paper on the "Incidence of Eclampsia in the Edinburgh Royal Maternity Hospital," producing statistics for a period of 22 years, firstly with regard to its increase, secondly with regard to its severity, thirdly with regard to the mortality, and lastly and specially with regard to its seasonal incidence.

He showed by numerous tables that there was a marked increase, especially

during the last 13 years, and showed that it occurred less frequently in the country than in the town, and deduced the fact that the cause of the increase in cities was probably the alteration in the dietary.

He further showed that the death-rate was distinctly diminishing, but that the severity remained unaltered. He explained this by a clearer knowledge of toxæmia, and the patients being sent in earlier and therefore more amenable to treatment. He also attributed the decreased mortality to improved methods of treatment, which he discussed.

With regard to the seasonal incidence he compared the tables taken from many parts of Germany and from New York with his own and found there was such a diversity of opinion on the subject, and the difference in the occurrence in the actual and relative months so slight, that he was disposed to discard the seasonal influence in the causation of eclampsia, and endeavoured to prove that it was not a question of seasons but the exposure of toxæmic patients to sudden changes of temperature at any time of the year, and he supported his opinion with numerous tables.

The paper was discussed by Dr. Berry Hart, Dr. James Ritchie, Dr. Fordyce, Dr. Keppie Paterson, Dr. Nicholson, and the President.

Dr. James Young read a paper on "Treatment of Contraction of Pelvic Outlet"—two cases, one treated by pubiotomy, the other by induction—which will appear in the *Journal*.

Sir Halliday Croom agreed that Dr. Young's case was the ideal one for pubiotomy, which should be the accompaniment of forceps where forceps had failed, head down, and Cæsarean section an impossibility, and where reduction had been tried once or refused. Dr. Berry Hart considered pubiotomy a good operation. Dr. Lackie referred to the ease with which he performed it in a case of contracted inlet. Dr. Fordyce had assisted at two pubiotomies both of which had had after-results. The President agreed with Sir Halliday Croom that contracted outlet afforded the ideal condition for pubiotomy, and emphasised that cases must be very carefully chosen.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

By JOHN D. COMRIE, M.A., B.Sc., M.D., F.R.C.P.,
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RECENT WORK ON DIAGNOSIS.

Oral Auscultation.—A new method of physical examination for the lungs is described by Dr. Koan Takata (*Berl. klin. Wochenschr.*, 8th January 1912). For the purpose of this the patient preferably lies upon some resounding material, such as a wooden seat, but may sit or stand. An ordinary binaural stethoscope with funnel-shaped end is held in front

of the mouth, which is widely opened, and the patient breathes as quietly as possible. The author of the method praises it as particularly valuable in hearing the crepitations of early phthisis, for they are detected readily, quickly, and without trouble to the patient, and after they are heard their seat of origin can be localised by the old method.

The coughing phenomenon in radiological examination of the lungs is appreciated by Kreuzfuchs (*Munch. med. Wochenschr.*, 9th January 1912). When the apex of the lung is examined by the X-rays and screen in healthy individuals, or in those whose lung-shadow is denser than normal in this region because of catarrh and atelectasis, there is always a marked change in density upon coughing; when, however, the density is due to tuberculosis, as a rule no such change can be made out on coughing.

A new symptom in aneurysm of the aorta is described by Hoesslin (*Munch. med. Wochenschr.*, 2nd January 1912). It consists in the fact that when a large aneurysm presses upon the trachea or bronchial tube expiration is more interfered with than inspiration. Consequently auscultation may find the inspiratory sound quite normal, but expiration is apt to be prolonged and stridulous, with four or five interruptions in each breath. This is due to the fact that the passage for the air is freer during each diastolic emptying of the aneurysm. When present the sign is very striking.

Cardio-respiratory murmurs are divided by Carey Coombs (*Quart. Journ. of Med.*, January 1912) into two classes as the result of his experience of such auscultatory phenomena in 180 cases. In one set of cases the murmur is heard about the pulmonary area, but in by far the greater number it is best heard just outside the apex beat. These sounds are not difficult to diagnose from true cardiac bruits, because they vary with respiration and posture, are generally mid-systolic, being separated by quite an appreciable interval from the first sound, are distinctly localised and not propagated in any special direction like the valvular murmurs, and, as a rule, are lessened or abolished when the patient lies on his back. The murmurs may be heard in quite healthy people, but are especially likely to occur in persons the subject of tuberculosis of the lungs (about one-third of the cases) and in the subjects of nervous excitement. The writer believes that these murmurs are due to friction between the pleural surfaces produced during inspiratory expansion, and accentuated to the point of audibility by the impact of the ventricles in systole, and adduces several facts to prove this. He has found that the murmur is often a useful aid in the diagnosis of pulmonary tuberculosis.

RENAL DISEASES.

The clinical significance of certain forms of albuminuria is discussed by Elliott (*Interstate Medical Journal*, December 1911). He recognises

in addition to the nephritic albuminuria of previous or chronic kidney disease the occurrence of a simple continuous type and of a form dependent on arterial hypertension without kidney disease. With regard to the simple continuous form, usually treated as obscure cases of Bright's disease, he states that he has observed numerous cases over several years, and found that no further cardio-vascular, retinal, or other serious symptoms developed. These cases may be accompanied by hyaline or even finely granular casts, but the presence of degenerative casts, such as coarsely granular, fatty, or waxy varieties, affords clear evidence of nephritis. He quotes Hastings and Hoobler (*Amer. Journ. Med. Sci.*, vol. lxxxiii. 1907) upon the discrepancy found between the occurrence of albumin and cases certainly diagnosable as nephritis. These writers found in a series of 5000 urine examinations that 1014 contained albumin, 474 albumin and casts, while of the latter only 125 could be clinically diagnosed as cases of nephritis.

This is generally in agreement with the opinions expressed at a discussion opened by Goodhart (*Journ. of the Royal Soc. of Med.*, May 1911). The introducer of the discussion had found cases of adolescent albuminuria to amount to the number of about 202 in 30,000 cases of disease of all sorts. Of these he was able to trace the after-history in 38 cases, and found that none developed kidney disease. He formed the opinion, therefore, that the albuminuria of the adolescent has no sinister effect upon health or upon the duration of life, and that with due circumspection such cases ought not to be excluded from the advantages of life insurance, or from clerkships in banks and other public and private offices.

The relation of tuberculosis of the kidney to tuberculosis of the lungs is dealt with by Cunningham (*Boston Med. and Surg. Journ.*, 7th December 1911). He found that, taking the available post-mortem records of pulmonary tuberculosis, which numbered 825, the kidney was also affected in 70 cases, or 8 per cent. The tuberculous process in the lungs was of all grades, from healed foci to the most destructive excavation or acute miliary tuberculosis. With the kidney affection tuberculosis of the bladder was associated in 14 cases, or 20 per cent. In order to discover whether the fact of associated renal tuberculosis could be determined at an early stage the urine of 216 patients suffering from pulmonary tuberculosis was examined. Of these 13 showed the presence of albumin, but none gave a positive reaction upon inoculation. It may therefore be assumed that it is not common for the tubercle bacillus to be eliminated through the kidneys without producing disease of these organs.

VACCINE TREATMENT OF ENTERIC FEVER.

This is discussed by Sadler (*Quart. Journ. of Med.*, January 1912), who records the results of treatment in 52 cases upon these lines. He

gives résumés with charts of a number of cases that illustrate the effects of vaccine and of variations in quantity and in spacing of the doses. He comes to the general conclusion that small doses suit better than the large doses of 300 or 350 million bacilli recommended by Smallman and others. He therefore gives in severe cases of the cerebral type with delirium an initial dose of one million bacilli (or proportionately less to a child); if the case be one of ordinary severity a dose of two million is administered. Thereafter doses of one million are given at intervals of four or five days, or not more than six days throughout the disease. The writer believes that this form of treatment is generally beneficial, making "average cases mild, severe cases into average cases, and it is only the very worst cases that it does not affect favourably;" yet he admits that "statistically there has been no improvement of our death-rate."

ELIMINATION OF RADIUM.

The distribution and excretion of radium and its emanation after internal administration has been experimentally studied by Bellingham Smith (*Quart. Journ. of Med.*, January 1912). Administering various radium preparations to mice, both in the food and subcutaneously, he found that the elimination takes place principally by the bowel, next by the kidneys, and not at all by the liver or skin. In the lungs a considerable amount was always found after injection, while the elimination of the radium emanation appears to take place solely through this channel. This is highly important in view of the suggested administration of radio-active waters, etc., in pulmonary phthisis. The elimination takes place quickly, and was found to be complete even after powerful doses in so short a time as four hours. Various radium emanatoriums have been opened in Germany and Austria during the past year for treatment by means of inhalation of thermal waters containing radium emanations (*Wien. klin. Wochenschr.*, No. 1, 1912, and No. 3, 1912), and this most modern form of spa treatment seems natural in view of the special permeability of the lungs to the emanations.

SURGERY.

By J. W. STRUTHERS, F.R.C.S.,
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THE TREATMENT OF TUBERCULOSIS OF THE KIDNEY.

At the last meeting of the German Urological Society an interesting discussion took place on the treatment of renal tuberculosis which resolved itself into a comparison of the relative merits of conservative and operative methods (*Zeitschr. f. Urologie*, 1912, vol. i.).

At the sitting where tuberculin treatment was specially discussed the following conclusions were formulated by Bachrach, who introduced the subject:—1. Operable cases of renal tuberculosis are not suitable for tuberculin treatment. 2. Early cases where bacilli are found, without marked suppuration or interference with kidney function, may be treated with tuberculin till a definite indication for nephrectomy arises. 3. After nephrectomy tuberculin treatment is advisable if tubercle is present in the genital tract or elsewhere. 4. Tuberculin treatment results in improvement of the general health. 5. Definite cure of local deposits has so far not been proved. 6. Tuberculin treatment must be carried out so as to produce no reaction. 7. Inoperable cases of renal tubercle are not appreciably influenced by tuberculin, although the treatment may be tried in the absence of any other therapeutic measure likely to be of assistance.

Other speakers agreed substantially with these conclusions, in particular that tuberculin treatment was not to be regarded as a substitute for the operative treatment of renal tuberculosis.

In the discussion on the results of nephrectomy for tubercular kidney, Wildbolz emphasised the difficulty of arriving at definite conclusions with regard to the results of conservative treatment owing to the very inconclusive nature of the reports available for study, and stated that genuine cases of permanent recovery in which the urine has become healthy and both kidneys have been found to functionate normally are not to be found in the literature. He maintained that numerous reported cures after tuberculin treatment had all been reported too early to allow of a final verdict being arrived at.

In order to arrive at a definite finding he obtained information from a large number of medical men, which yielded 316 cases bacteriologically examined and proved to be tubercular. 218 of these, *i.e.* 70 per cent., had succumbed to the disease within 5 years of its onset. Only 30 of the 98 surviving cases were free from marked symptoms, and in this connection he pointed out as a noteworthy feature that among the fatal cases a number had shown apparent cure for months or years till the disease reappeared and proved fatal. In addition to these 316 cases, all treated by conservative measures, Wildbolz carefully investigated his own records and those of a colleague which showed very similar results. His investigations led him to summarise as follows:—Under conservative treatment the majority of cases die within 5 years. Rather more than 20 per cent. of cases survive more than 5 to 10 years, a few even longer. In a small minority of cases the symptoms practically disappear, so that the patients might be regarded as cured did not a thorough examination of the urine and the eventual reappearance of symptoms prove the contrary. An apparently genuine lasting cure has only been noted in isolated cases out of thousands reported, and these are too few to invalidate the statement that tuberculosis of the

kidney is not curable, as a rule, by conservative measures in use at the present time.

On the other hand, the results of operative treatment show a high percentage of cures. Israel, speaking from a study of 1023 cases, claimed 75 per cent. of cures. 12·9 per cent. of the deaths took place within 6 months, the remainder mostly within 2 years after operation. His mortality was higher in males than in females. The chief cause of the deaths occurring soon after operation was miliary tuberculosis; of the later deaths, phthisis and disease in the remaining kidney.

Wildbolz's own material showed 60·8 per cent. of cures, and in general it appeared from the results reported by a number of observers that well over 50 per cent. of cures are obtained by operative treatment.

As regards proof of cure, it may be noted that Israel, Casper, and others regard the results of inoculation tests as the only reliable means of proving the absence of tubercle bacilli from the urine, for bacilli may be found in urine which on ordinary examination appears healthy and free from albumin.

OPERATIVE RESULTS IN CASES OF INTRA-CRANIAL TUMOUR.

Von Eiselsberg (*Wien. klin. Wochenschr.*, No. 1, 1912) gives the results in all his cases of operation for cerebral tumours to January 1912. They number exactly a hundred. Forty-three operations were done for cerebral tumours; in 11 of these no tumour could be found. Twelve of the 43 survived over periods varying from a few weeks to five years, and were operated on in 4 cases for glioma, 6 for endothelioma, 1 for angioma, and 1 for secondary melanotic sarcoma. Apparently in only one of these can complete recovery be said to have taken place; the others all show varying degrees of disability. Eleven operations were done for cerebellar tumour, and in 5 of these death followed the operation directly. In two cases of apparently successful removal of tubercular nodules death occurred within a short time from tubercular meningitis, in accordance with the general experience in such cases. In only one case—that of a cyst—has lasting benefit followed the operation. In 12 cases operation was done for tumours of the 8th nerve in the cerebello-pontine angle. Four of these have survived from 1 to 2½ years, and have been much relieved by the operation, though only one is completely well and able for work. According to von Eiselsberg these cerebello-pontine tumours of the 8th nerve offer decidedly the best prospect of success, as they are usually simple in nature, and every effort should be made to operate on them early, before optic atrophy has set in and destroyed the chance of restoring vision. The greatest care should be taken to avoid bruising the cerebellum, and a piecemeal removal of the tumour may even be desirable in order to spare the cerebellum.

In 11 cases in which a diagnosis of tumour of the cerebellum or 8th nerve was made no tumour was found. In one of these complete recovery followed, and has lasted for 8 years. It is noteworthy that out of 34 cases in which the cerebellum was exposed 22 died as the direct result of the operation.

In 10 cases in which a diagnosis of tumour was made but in which localising symptoms were not present, decompression was done often with marked relief, but never with complete cure.

The record is completed with a description of the technique followed, in which there is nothing of special note.

THE NATURE AND TREATMENT OF STENOSING TENDO VAGINITIS AT THE STYLOID PROCESS OF THE RADIUS.

In 1895 de Quervain first described the condition which he named stenosing tendo vaginitis, and which he regarded as a clinical entity. Since then three other writers—Wolti, Marion, and Poulsen—have independently described the same condition, and de Quervain has met with a number of cases in addition to the eight on which he based his first communication. In a recent paper (*Münch. med. Wochenschr.*, No. 1, 1912) he gives the results of his extended experience, which is worth noting, because the existence of the affection is not generally recognised. It is limited to the sheath enclosing the tendons of the abductor longus pollicis and extensor brevis pollicis at the lower end of the radius, and is characterised by the following symptoms:—The patient suffers from pain radiating from the thumb to the wrist and forearm, and from weakness of the thumb, so that the grasping power is seriously weakened. Palpation reveals marked tenderness of the affected sheath, while the surrounding parts are free, and there is usually some thickening of the sheath to be made out. Examination of the sheath and tendons exposed by operation and histological examination of the tendon sheath removed, show merely a thickened sheath too narrow for free play of the enclosed tendons. The thickening is fibrous, and does not show any signs of old or recent inflammatory change, while the tendons appear unaffected. The affection is most commonly found in women, especially those engaged in house work, and is usually caused by over-strain. It is not a sequel of tendo vaginitis crepitans, and in distinction to that affection, it usually begins gradually and is often present for months before the patient applies for treatment. In addition, redness, œdema, infiltration of the surrounding parts, and exudation into the tendon sheath are never present. In recent cases palliative treatment, such as the application of counter-irritation with rest, may be tried, but the affection is an extremely chronic and obstinate one, and in old-standing cases de Quervain favours immediate resort to operation. This is carried out under local anæsthesia, and consists in opening freely

the affected tendon sheath, so that the tendons spring from it, and are no longer confined by the thickened wall of the sheath. The immediate and permanent relief which follows this simple measure is good evidence in favour of de Quervain's view that the symptoms are due to simple thickening of the sheath, preventing free play of the enclosed tendons.

CLOSURE OF THE PYLORUS WITH A STRIP OF FASCIA.

Professor Wilms (*Deut. med. Wochenschr.*, No. 3, 1912), in considering the readiest method of closing the pylorus after gastro-enterostomy for duodenal ulcer, thought of using a strip of fascia from the anterior sheath of the rectus abdominis, and has found the method answer well, especially when the pylorus was fixed and difficult to manipulate. The strip is cut from the exposed rectus sheath, passed round the pylorus, and either knotted or fixed with sutures, so as to close the lumen completely.

OBSTETRICS AND GYNECOLOGY.

By J. W. BALLANTYNE, M.D., F.R.C.P.,

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PREGNANCIES, NORMAL AND MORBID.

AT a meeting of the Medico-Chirurgical Society of Bologna in the past year (*Ann. di ostet. e ginec.*, ii. for 1911, p. 348) Dr. Bordè dealt with *the meaning and purpose of modern maternity hospitals*. In past times such institutions had as their chief object the removal from the public view of marriageable women whose pregnancies were visible; these places had the rules and discipline of a monastery. Further, the conditions in them were such that the mortality in them varied (in normal circumstances) from 5 to 10 per cent. and the morbidity reached as high a level as 80 per cent. Now a revolution had been effected through the discovery of the nature and cure of puerperal sepsis, and women could be more safely delivered in maternities than outside them. But, further, with the rapid advance which had taken place of late years in hygiene and in social ideas, maternity hospitals had a more complex function to perform, and had a high hygienico-social value. In order to make this quite clear Dr. Bordè gives statistics regarding the institution (*Asilo di Maternità di Bologna*) over which he presides; the results are for the period from January 1908 to October 1910 inclusive. The beneficent action of the hospital was evident along several lines: there was, first, the treatment of pregnant women who were ill; there was, second, the protection of pregnant women against illness by rest, proper hygiene, moral surroundings, etc.; there was,

third, the benefit to the unborn infant that such care of the mother accomplished (endo-uterine puericulture) and the protection of the illegitimate infants after birth (extra-uterine puericulture); and, finally, there were the ordinary advantages of professional management and nursing in labour and the puerperium. The interest of Dr. Bordè's communication lies chiefly in the part relating to the care given to the pregnant woman and her unborn child. In this country (Britain) such work has been called prematernity treatment, and the place in which it has been carried out has been named a prematernity ward. Dr. Bordè admitted 432 pregnant patients, of whom 73 (16·89 per cent.) were suffering from illness; the last named were treated in the adjoining infirmary. There were only five cases of albuminuria (1·18 per cent.) and two of eclampsia (0·47 per cent.). Eleven women had subacute blennorrhagia and two had secondary syphilis. There was one death among these morbid pregnancies, and this was from acute miliary tuberculosis four days after induction of labour; the child was born alive but died four days later, also from tuberculosis, a circumstance to which Dr. Bordè draws special attention. The details of the labours need not be given here, suffice it to say that there were 423 confinements (including three abortions) with no maternal mortality. The effect upon the pregnant women of the rest, good hygiene, and quiet moral surroundings is interesting. The women, on their admission, were weighed and measured; they had a bath and afterwards were examined, had their urine tested, and their bowels cleared out. They were given good and suitable food. They led a healthy but not an idle life, and if they became ill they were transferred to the infirmary. They lost a little weight during the first few days, perhaps on account of the purgation and the change of diet, but afterwards the weight gradually increased, allowing for the natural increase in the pregnant uterus. After a month of such treatment the average gain in weight was 1·103 kilogram, after two months 2·829 kilograms, and after three months 4·775 kilograms. But the infants as well as the mothers showed the good effects. There was a gradual fall in prematurity. Of the women who came in whilst in labour 67 per cent. went to the full term or beyond it; of those who had ten days' rest, etc., 67·5 per cent. went to term; of those who had from 10 days to a month's rest and treatment 74 per cent. went to term; of those who had from one to two months' rest 74·6 per cent. went to term; and of those who enjoyed the care of the hospital staff for from two to three months 87 per cent. went to term. Again, the weight of the infants increased with the time the mothers spent in the maternity: after one month 54 per cent. weighed more than 3 kilograms and 4·9 per cent. weighed more than 3½ kilograms; after two months 62·7 per cent. weighed more than 3 kilograms and 27 per cent. more than 3½ kilograms; and after three months 70·4 per cent. weighed more than 3 kilograms and 42·1 per cent.

more than $3\frac{1}{2}$ kilograms. Of the 423 foetuses six died during pregnancy—four from syphilis, one from monstrosity, and one from placental separation and accidental hæmorrhage. The improvement pursued the infants into their postnatal life, for out of 423 infants only 4 (0·94 per cent.) died during the first ten days after birth—three from asphyxia from dystocia, and one from its prematurity. These results are very interesting and satisfactory, and there seems to be little doubt that in some measure the prematernity treatment must be given the credit for them. The rest before confinement, along with good food, healthy surroundings, and the avoidance of excitement, seem all to have united to give the mothers greater vitality, more perfect nutrition, full-term labours, and good recoveries, whilst the unborn infants seem likewise to have benefited, remaining in the uterus till they were mature, and showing at birth satisfactory development and a good weight. It must further be remembered that the pregnancies so treated were all illegitimate ones. There seems to be no reason against but every advantage in extending the benefits thus gained to women of the poorer class who are legitimately pregnant.

Among the rarest of the complications of pregnancy must nowadays be reckoned *rupture of an ovarian cyst*. Formerly, when ovariectomy was little or not at all practised, when, consequently, such tumours attained large dimensions, and when tapping was frequently resorted to, the risk of rupture in pregnancy was much greater. Still it must be borne in mind that pregnancy predisposes to rupture, for ovarian tumours often grow more rapidly in pregnancy, changes in the circulation may easily lead to alterations in the structure of their walls, and there is a marked increase in abdominal pressure, especially in the later months. Dr. Ercole Cova (*Annali di ostetricia e ginecologia*, ii. for 1911, pp. 269-309) has, therefore, done a useful piece of work in gathering together all that is known regarding this accident of pregnancy. Of course all the causes which predispose to rupture in pregnancy are exaggerated in labour, especially in the second stage; but Dr. Cova excludes these cases from his review. His communication is founded in the first instance upon the occurrence of a case of rupture of an ovarian cyst during the first pregnancy of a married woman, 21 years of age. She was near the full term when Dr. Cova examined her and found a tumour at the left side of the uterus; it was semi-solid in consistence, and Professor Pestalozza, who saw the case in consultation, diagnosed it as an ovarian tumour, probably a dermoid. Shortly afterwards the patient fell, hitting her abdomen in the region occupied by the tumour; this was followed by sharp pain and faintness which, however, had to some extent passed off when she was seen half an hour later by Dr. Cova. The tumour was no longer palpable near the surface, it could only be felt on deep palpation, and there was evidence of free fluid in the peritoneum. Traumatic rupture of the cyst was

diagnosed, the patient was brought into hospital on the following day, and two days later Professor Pestalozza opened the abdomen. The tumour, a dermoid, had a laceration in it 12 cms. (about 5 ins.) in length. The tumour was easily removed and the abdomen closed (in 3 layers). On the following day labour came on, the forceps was applied as the infant presented by the forehead, and the child was born within 26 hours of the laparotomy and with no ill effects. Mother and child did well. The author, in the second part of his article, has collected together cases resembling the above from medical literature, and he discusses diagnosis, prognosis, and treatment. For instance he found eleven cases of rupture of dermoid tumours of the ovary in pregnancy; in three of these cases death occurred, but it is noteworthy that two of the three fatal cases were patients who were not operated on. Of the nine patients upon whom laparotomy was performed eight recovered, and in the case of the one who died the rupture had occurred some time before and the operation was difficult. The rational treatment in the case of rupture of an ovarian cyst (especially a dermoid) in pregnancy is prompt operation by laparotomy; it is dangerous to allow the pultaceous contents of a dermoid cyst to remain long in contact with the peritoneum. Far from leading us to regard pregnancy as a contra-indication to operation in such cases, its existence ought to make us more anxious to adopt surgical measures at once.

In a long and able paper Dr. A. Laffont of Algiers (*L'Obstétrique*, N. S., vol. iv. pp. 777-819, 1911) deals with *malaria in its relations to pregnancy, labour, and the puerperium*. It is with the influence exerted by malaria on gestation and the contents of the uterus that we are here alone concerned. At any time in pregnancy malaria may intervene and produce ill effects. Whilst some writers regard malaria as causing sterility, others do not think that it interferes with impregnation; if it has a restraining effect upon conception, it is probable that it is only when it exists in a chronic form. There is likewise a difference of opinion as to the effect of malaria upon the continuance of pregnancy, but there are comparatively few authors now who do not admit a tendency to abortion or premature labour in women suffering from intermittent fever. From statistics it would appear as if abortion occurred in about 8 per cent. and premature labour in 28 per cent. of the cases, and the former result would seem to be specially connected with acute malaria and the latter with the chronic form. The patients who reach full term have either had slight attacks of malaria of short duration, or else they have been the subjects of active treatment with quinine. The exact cause of the early expulsion of the uterine contents is not known with any certainty, but it may be the internal congestion (in the cold stage), the disturbance to the nervous system, the anæmia, the rise of temperature, or the death of the fœtus *in utero*. Further, in pregnancies complicated by malaria there appears to be a special

tendency to develop eclampsia, so much so that a variety of this dangerous malady has been named *malarial eclampsia* : but there is still much that is uncertain regarding this matter and much that requires further investigation. There are three ways in which the unborn infant (embryo or foetus) may be affected by malaria in the mother. In the first place malaria may be transmitted to the child through the placenta ; this does not occur always, but there is no doubt it sometimes happens. Although suspected before Laveran's discovery of the causal hæmatozoon of malaria, the occurrence of foetal malaria could not be scientifically proven till the cause had been recognised and found in both mother and foetus. Dr. Laffont, taking into account all the evidence, positive as well as negative, regards the existence of *congenital malaria* as incontestable. We may speak of an embryonic form of congenital malaria in which the embryo and its membranes are attacked, with the occasional result that abortion follows, and of a foetal form in which hæmatozoa are found in the blood of the foetus (Dumolard and Viallet) and in which there are shivering movements of the unborn infant and enlargement of its spleen. Further, Dr. Laffont speaks of *hereditary malaria* ; under this name he would place the cases of infants born at term which show then or soon thereafter malarial manifestations of maternal origin. He enumerates two chief varieties—*early hereditary malaria of the new-born*, either acute, chronic, or latent, and *early hereditary malaria of the infant* (in which the manifestations appear subsequent to the separation of the umbilical cord but not later than the fifth month). He also suggests the possibility of a third form—*late hereditary malaria*. It is very doubtful, however, whether the word *hereditary* should be used here at all. From the study of a considerable number (47) of cases Dr. Laffont thinks that the tertian and quartan forms of malaria are those which pass most easily from mother to foetus. Cases in which there are repeated attacks proving rebellious to quinine are not always those which seem to favour the passage of the hæmatozoon ; it passes also in the benign forms. The occurrence of malaria in the last three weeks of pregnancy specially favours transmission. The absence of hæmatozoa does not necessarily mean that the foetus is free from malaria. It is not yet known what it is that makes the placenta permeable in some cases and not in others. But the foetus may show other results. It may not be affected with malaria and yet exhibit arrested development and growth and even show malformations and monstrosities. Again, embryonic or foetal death may occur ; probably this is sometimes due to malarial infection, but in other cases it seems to have been caused by the toxins or by the rigor or the high temperature. Some interesting observations (*e.g.* by Louros) have been made upon the placenta in malaria, but without revealing any characteristic lesion of that organ. Pregnancy neither confers immunity against malaria nor does it seem specially to predispose to it, although

pregnancy may apparently wake up a latent malaria or transform a chronic attack into the pernicious form. Whilst fears have been expressed lest quinine given in a pregnancy complicated by malaria may lead to abortion from the oxytocic action of the drug, Laffont agrees with most modern authorities in thinking it may be given freely and fearlessly. In so treating the mother one best treats the fetus.

THERAPEUTICS.

By J. EASON, M.D., F.R.C.P.,
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THERAPEUTICS OF BILE.

FOR many years it was believed that bile exercised an action on intestinal bacteria, resulting in the prevention or limitation of putrefactive and fermentative changes of the contents of the bowel. The fact that intestinal fermentation was believed to be considerably increased in animals with biliary fistula and in the human subject with biliary obstruction seemed to support this view. On the other hand, many observations of more recent date make it necessary to keep an open mind in regard to this matter. Thus Bidder and Schmidt state that not only does bile possess no toxic action on putrefactive microbes, but that it tends to putrefy too easily to possess such properties, many bacteria thriving on it. Inouye and Sato say that animals with a biliary fistula, when given little or no fat in an otherwise sufficient diet, show no greater putrefactive changes of the bowel contents than do normal animals. Therefore if increased putrefaction does occur on a diet unrestricted in fat, it is not directly due to absence or deficiency of bile, but to the diminished absorption of fat which such biliary deficiency produces. That bile does not have any antimicrobial function also appears from the experiments of Matsushita and Strasburger. So long ago as 1902 Matsushita showed that the bacillus of typhoid fever and other intestinal bacteria grow better on media containing bile than on those containing none. Sato has recently confirmed Matsushita's work. Again, Strasburger found that in animals in which a biliary fistula had been made the faecal bacteria were less than the normal, viz. in the proportion 3·2:8.

The problem is made more puzzling still by Schmidt and Sato, who have independently shown that fatty stools do not ferment or putrefy; they attribute the increased odour of fatty stools to the larger percentage of fatty acids contained in them. Padoa has recently shown

that ox bile and (though to a less extent) human bile possess an antitoxic action towards the toxic products of human faeces and of filtrates of *B. coli*. It is also known that bile increases peristaltic action and hastens the evacuation of the bowels. It was also supposed that bile had a diastatic action, and bile or bile salts seem to render the diastatic property of the pancreatic juice more active when they are mixed with it. There is, however, no amylase in bile. So far as our present knowledge goes, the most important function which bile performs is the promotion of fat splitting and fat absorption. Fleischer believes that bile contains a fat-splitting ferment, while others suggest that bile merely activates the pancreatic steapsin. Fat splitting is increased $2\frac{1}{2}$ to 3 fold in the presence of bile according to Hencki. Fat splitting also results from the action of the intestinal bacteria, and as bile is now by some supposed to promote the growth of bacteria, it should therefore indirectly promote bacterial fat splitting.

Therapeutic Action of Bile.—Inouye and Sato recommend the administration of bile on the same principle as trypsin or thyroid therapy. Long ago in Europe a certain value was attributed to the giving of bile. By its introduction physicians sought to further the secretory function of the diseased liver or to hold in check the disturbances of digestion resulting from deficiency of bile. In Japanese and Chinese medical literature a therapeutic value was ascribed to bile, especially as a vermifuge, analgesic, and nerve stimulant. The bile of the bear was especially sought after. In diseases of the stomach, diabetes mellitus, and as an antidote for arrow poisoning bile was also tried, but with doubtful results.

In ancient times, too, disease of the liver and icterus were treated by bile administration, but in more recent times such treatment was discredited, as the bile appeared to interfere with pepsin digestion. Attempts were made to overcome this difficulty by coating the bile with some substance, unaffected by the gastric juice but digested or dissolved in the bowel. The following preparations fulfil these conditions:—(1) Sahli's glutoid capsules made of gelatine hardened in formaldehyde. These are usually quickly dissolved in the bowel, and are supposed to escape digestion in the stomach. When the obstruction involves both the common bile and pancreatic ducts, such capsules are useless, as the solution of the capsule depends chiefly on pancreatic action. (2) Rumpel's capsules. An improved form of Sahli's capsules, a more suitable concentration of formaldehyde being used to harden the gelatine. (3) Pills made with sheep fat according to Jaworski. Inouye has conducted careful experiments which confirm Jaworski's opinion that these pills do not melt or dissolve in the stomach and dissolve quickly in the bowel. (4) Ovogal. This is a chemical combination of fresh ox bile with albumen, which does not dissolve till it reaches the intestine.

As the above preparations are sometimes difficult to obtain, Inouye and Sato of Japan made a series of observations to determine whether watery solutions of bile of definite concentration caused subjectively recognisable disturbances of the gastric function. They administered a watery solution to a large number of patients and healthy men, and in no case did they observe disagreeable symptoms. Everyone was able to take 3 grms. of a preparation which was equivalent to 30 grms. of fresh ox bile. The bile was administered to the fasting stomach, as it is still an open question if bile neutralises the gastric acid and interferes with the peptic digestion.

Inouye and Sato conducted a further series of experiments in the treatment of disturbed bile secretion by administration of dissolved inspissated ox bile. Twenty-three cases of icterus were treated. Eighteen of these were of the catarrhal type, and those cases which were continuously treated with ox bile ran a shorter course than those in which the treatment was not given or was interrupted. This type of case does not, of course, furnish a conclusive therapeutic test; but the remaining cases of the series included cancer of the liver, gallstones, and gastroduodenal catarrh, and it was noted that, in every variety of case, improvement followed on this treatment, the pains in the abdomen vanishing and the appetite improving; diuresis was increased, and the bowels were regulated without purgatives. On examination of the faeces it was found that the amount of fat in the stools was greatly reduced. The fat resorption was increased 18 to 63 per cent. in 15 cases in which, owing to disease, there was a deficiency of bile entering the bowel, and it was found that all forms of fat were better absorbed during the treatment.

In this series of experiments Inouye and Sato confirmed their former observation that bile well diluted with water and administered on an empty stomach does not disturb the gastric digestion, as has hitherto been believed. Both these experimenters regard this treatment as a rational form of organic therapy and an effective means of treating the symptoms resulting from various forms of icterus. Although the taste of the watery solution of bile is very bitter, they found it fairly well borne, and they had no experience of the treatment being resisted. The solution is best administered in peppermint or other aromatic water with the addition of sugar, the daily dose being 2 to 3 grms.—0·5 to 1·0 gm. is given thrice daily one hour before meals. Husemann recommends the addition of a laxative such as aloes or jalap, but Inouye and Sato agree with Brunton that bile, given alone, leads to satisfactory evacuation of the bowel.

Eichler and Latz have recently made an experimental study of various purgatives which have an English and French reputation as cholagogues. Their latest experiments refer to iridin and euonymin. In regard to iridin, no increase of bile flow occurred, and there was no

real change in its composition. Euonymin likewise caused no increased secretion but rather a diminution of bile. The solid constituents were also slightly diminished.

Z. Inouye und T. J. Sato, *Archiv. f. Verdauungs-Kr.*, Bd. xvii. Heft 2, S. 185.
F. Eichler und B. Latz, *Ibid.*, Bd. xvii. Heft 2, S. 133. G. Padoa, *Rivist. Critica di Clin. Med.*, Juliheft, 1910.

TREATMENT OF EXOPHTHALMIC GOITRE.

An interesting paper by Anastasia Tschikste has been published in the *Deutsch. med. Woch.*, No. 48, 1911, based on work carried out by him in the Bern Surgical Klinik (Th. Kocher) and in the Mediz. chemisch Institut of the university. Tschikste states that clinical and experimental investigations prove that iodothyrim has not the full actions of thyroid extract, and A. Kocher has shown that colloid contains a phosphorus body which varies in amount inversely with the iodine. He refers to Cyon's work as evidence of the physiological antagonism between iodothyrim and sodium phosphate in its action on the cardio-vascular nerves, and to Kocher's view that there is a substance in colloid which acts favourably in exophthalmic goitre. Such is the theoretical basis of the phosphorus treatment by thyroid nucleoproteid. Tschikste obtained nucleoproteid from goitrous thyroids in Kocher's clinic by the method of Oswald, the thyreoglobulin being separated in a half saturated solution of ammonium sulphate and the nucleoproteid in a fully saturated solution. The proteid contained 0.35 per cent. phosphorus. The total quantity obtained was so small that its action could be tested in only one case of exophthalmic goitre in regard to (1) metabolism, and (2) the general condition of the patient. The mode of administration was by deep injection in the gluteal region. After the patient had been under observation for three weeks the first injection of 10 grms. of a 2 per cent. solution in normal saline was given on 26th February. Thereafter 20 grms. of a 1 per cent. solution were administered on 2nd March, 13th March, and 18th March. The food given was measured and analysed, and the stools and urine were carefully examined quantitatively for nitrogen and phosphorus. It was found that after injections there was a retention of nitrogen, so that for the first time a positive balance was established. A similar effect was found in regard to phosphorus metabolism.

The observations appear to have been made with care, and confirm the allied work of Cyon on the action of sodium phosphate. Tschikste lays emphasis on the fact that the retention of phosphorus and nitrogen did not gradually occur, but rather suddenly, and in relation to the nucleoproteid injections. The retention synchronised with rapid increase of the patient's weight, the total increase being 10.5 kgs.

from 18th March to 26th April. The other characteristic symptoms of the disease were not influenced greatly, except the pulse frequency, which diminished gradually.

Marine and Lenhart have made a very full investigation of their cases of exophthalmic goitre (*Arch. of Internal Med.*, vol. viii. pp. 265-316). The only practical suggestion made is that in extreme cases the use of 5 minims of the syrup of the iodide of iron should be given once daily for a week, increased during the second week to two doses daily, and double this amount in the third week. It is difficult to understand how such doses can be of material service, but they believe that by such means a colloid state of the gland may be promoted.

The multiplicity of suggestions alone suffices to show that neither medical nor surgical treatment is at present satisfactory. A genuine improvement in the mode of treatment may not be recorded until the physiologist and physiological chemist add considerably to our knowledge of the functions of the gland, and of the specially related internal secreting glands.

The opinions of Marine and Lenhart, based as they are on very careful work, can scarcely be disregarded, however heterodox they appear in the following words:—"The essential physiological disturbance of the thyroid in exophthalmic goitre is insufficiency, its reaction compensatory, and its significance symptomatic."

OPHTHALMOLOGY.

By ANGUS MACGILLIVRAY, C.M., M.D., F.R.S.E.,

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PHLYCTENULAR CONJUNCTIVITIS.

IN his thesis presented to the Faculty of Medicine of Liège in May 1911 Weekers (*Ophthalmology*, October 1911) seeks to establish in this clinical study, by anatomical and experimental investigation, the analogy between ocular phlyctenulæ and cutaneous tuberculides.

The work is divided into three parts:—

1. New pathogenesis of ocular phlyctenulæ.
2. Pathological anatomy of ocular phlyctenulæ.
3. Experimental researches on ocular phlyctenulæ.

First Part.—Tuberculosis is frequent in patients who have phlyctenular conjunctivitis. In 156 children examined—116 girls, 40 boys—and in adults—40 women and 18 men—the author has made the following observations:—

1. The hereditary histories are often tubercular (56 per cent. of children and 48 per cent. of adults).

2. There frequently exists localised tuberculosis (in 36 per cent. of children and 27 per cent. of adults).

3. The cutaneous reaction of von Pirquet is positive in 91 per cent. of children and in 55 per cent. of adults. According to Weekers this seems to demonstrate that phlyctenulæ seek to develop by preference upon tubercular soil, and in his opinion the phlyctenula would be a toxic tuberculide. He adduces the following facts to prove this:—

1. Phlyctenulæ seem to develop by preference in tubercular children.

2. With subcutaneous injection the local lesion reacts.

3. Phlyctenulæ frequently appear after an ophthalmo-reaction.

4. Among patients submitting to a cure by tuberculin, phlyctenulæ frequently appear.

5. There exists an anatomical and pathological analogy between natural phlyctenules and those produced by the ophthalmo-reaction.

6. Accompanying phlyctenulæ, lichen scrofulosum often appears at the same time.

Second Part.—Weekers has studied the histological structure in the stage of infiltration, ulceration, and cicatrisation.

Stage of Infiltration.—The conjunctival tissue presents vascular dilatations, principally of the lymphatic vessels; diapedesis of the leucocytes; serous transudation into the interstices of the conjunctiva. The epithelium shows the leucocytes on its surface, a thickening of certain cells with degeneration, and the formation of vacuoles filled with serum.

Stage of Ulceration.—Before being ulcerated the epithelium is raised and thickened; generally speaking, the excoriations are produced in several ways—sometimes the epithelium may completely disappear except at the summit of the phlyctenula. Beyond the ulcerated portion the epithelium is infiltrated and shows in places a vascular degeneration of its cells, in other places it is thickened and covered with tiny elevations. The bottom of the ulcer is occupied by leucocytes surrounded by fibrin and the conjunctival cells are often degenerated.

Stage of Cicatrisation.—The epithelium proliferates in an exuberant manner throughout the entire extent of the phlyctenula by sending out prolongations; karyokinesis is encountered in the superficial strata; fissures exist between the superficial necrosed layers and the deeper healthy layers. In the conjunctival tissue the infiltration recedes and gives way to conjunctival fibres.

The phlyctenulæ of adults, those coming on during the course of a microbic conjunctivitis, and those complicating an ophthalmo-reaction (by tuberculin) have the same histological structure.

Third Part.—The author has studied the action of tuberculin

upon the conjunctiva of healthy and tubercular animals. He has never been able to obtain the formation of phlyctenulæ after instilling tuberculin, even by irritating the conjunctiva, in healthy animals, nor is the ophthalmo-reaction produced in them.

On the contrary, in tubercular animals, by injecting into the peritoneum an emulsion of bovine bacillus, he has succeeded in provoking upon the conjunctiva an eruption having a great resemblance to the ocular phlyctenulæ of man; the ophthalmo-reaction is positive. In conclusion the author has observed phenomena of anaphylaxis in rabbits.

The reviewer has recently conducted a consecutive series of inoculations by the von Pirquet method in phlyctenular affections of the eye on the front of the forearm and on the same side as the affected eye. In the series, consisting of 87 cases, all the control scratches gave negative results, while the tuberculin scratches were positive in 98 per cent. of the cases.

Lafoe (*Wien. med. Woch.*, 4th February 1911) states that opinions differ as to the significance of phlyctenulæ as a symptom of latent or evident tuberculosis.

Ayreux believes that children with phlyctenulæ will always show symptoms of tuberculosis, while Lafoe is of opinion that a positive tuberculin reaction in a child suffering from phlyctenulæ will prove that there is a tuberculous affection of the body, but will not prove the phlyctenulæ to be the tubercular product. He considers the etiological factors of phlyctenulæ to be—(1) infectious diseases; (2) digestive disturbances and intestinal intoxications; (3) previous tubercular affections.

Since the days of Virchow the vulnerability of the epithelium, which has been considered to occur in scrofulous individuals, has been regarded as preparing the way for bacterial invasion. Continental observers allow only a limited etiological significance to the bacteria found, but some state distinctly that phlyctenulæ are due to a circumscribed inoculation with pyogenic cocci, especially the staphylococci. The results of Axenfeld, von Bach, Neuman, and L. Müller have shown that this is by no means the case. Their researches show that, especially in early cases, the results were negative in a comparatively large number of instances, and that in some of the remaining ones the number of micro-organisms found was so small, and the micro-organisms so various in their nature, that no definite causal conclusions could be drawn from their presence. Leber has shown that the giant cells which occur in phlyctenulæ are not of the Langhans' type, and do not prove any tuberculous element to be present. On account of these results Leber asked the question whether or not dead tubercle bacilli are concerned in the production of phlyctenulæ. Leber some time ago conducted elaborate experiments with excised phlyctenules

to discover tubercle bacilli, but he never found any. The reviewer, too, has never found any tubercle bacilli in phlyctenular conjunctivitis, and in his recent investigations he found no fewer than 63 per cent. of the cases giving "bacteria negative" findings. In his cases the micro-organisms seen were generally saprophytic and non-pathogenic. This result is all the more remarkable in view of the distinctly purulent character of the discharge in some of the cases examined. These purulent-looking cases showed such clinical symptoms as to justify the diagnosis of severe Koch-Weeks conjunctivitis or mild purulent conjunctivitis. The cause, then, of phlyctenulæ must still be regarded as a moot point. One thing, however, is certain—phlyctenulæ are not the direct result of the action of the tubercle bacillus, but according to recent investigations there is strong evidence in support of the theory that phlyctenulæ are the indirect result, *i.e.* of some form of toxin produced by the tubercle bacillus, which toxin, coming in contact with a suitable soil, sets up a local irritation in the shape of circumscribed patches of conjunctivitis, clinically known as phlyctenules.

As regards treatment, our bacteriological knowledge has not helped us much. So far the most efficacious remedy at the surgeon's disposal is yellow oxide of mercury ointment, gr. viii. to ʒi., which, although empirical, may be regarded as a specific. A phlyctenular affection *per se* is not a serious condition, provided its immediate environment be satisfactory. Phlyctenules as a rule undergo a process of ulceration. The conjunctiva, thus denuded of its epithelium, becomes exposed to bacterial invasion, a circumstance which obviously may give rise to serious complications. Local treatment should therefore be begun early, and general tonic treatment should invariably be prescribed in each case with the view not only of relieving the present condition, but of preventing relapses in the future.

NEW BOOKS.

Recent Methods in the Diagnosis and Treatment of Syphilis. By CARL H. BROWNING, M.D., and IVY MACKENZIE, M.A., B.Sc., Ch.B. Pp. 303. London: Constable & Co. 1911. Price 8s. 6d. net.

THE prominent part which the Glasgow School of Pathology has taken in contributing to recent investigations on the diagnosis and treatment of syphilis arouses special interest in this work. We may at once say that the high expectations which the position of the authors raise will not be disappointed, as their book constitutes, both from the practical and scientific standpoint, the best exposition of the subject which has yet appeared. As the title suggests, the work falls into two parts, which deal on the one hand with the modern methods of

the diagnosis of the disease, and on the other with the methods and results of the salvarsan treatment. In each case the exposition is thorough, and the difficulties which arise are fully discussed with a marked sanity of judgment. In the section dealing with the diagnosis by serum reactions, after correlating these with general serological methods, the authors proceed to a description of the original Wassermann method and of its more recent developments. The precautions to be adopted and the fallacies of the technique are treated of in great detail, and in such a way as to form a most efficient guide for the working bacteriologist. The outstanding feature here is the insistence on the substitution of a quantitative measure of the serum reaction for the qualitative estimate obtained by the original Wassermann method. This forms one of the most important original contributions made to the subject by the authors, and one the importance of which is becoming more and more widely recognised. In fact this technique alone furnishes reliable results, and all the shorter methods which have been introduced must be controlled by comparison with those obtained by means of it. This statement has an important bearing on the validity of many of the published data relating to the diagnosis of syphilis.

An important chapter deals with the theory of the syphilis reaction and with the present state of knowledge regarding the chemical nature of the substances concerned. Here the original work of the authors is in evidence, and the fact that the problem is still unsolved does not detract from the importance of the observations given. The first part closes with an enunciation of the results which have been obtained in the diagnosis of the varied manifestations of syphilis.

In the second part the chemical relationships of salvarsan and the experimental basis of treatment by the drug are discussed, and full directions are given for its administration. Many data are given regarding the results which have been obtained, and here, again, the personal experience of the authors bulks largely, and adequate attention is paid to the objections which have been raised to the new treatment and to the dangers which are involved. As is natural it is impossible to dogmatise as to the permanency of the results in such a chronic disease, but the authors are clearly right in their view that better results are obtained by the use of salvarsan than with any other agent hitherto applied.

In many parts of the book the sidelights which the investigation of the drug have cast on the pathology of syphilis are dealt with, and special interest will be aroused by what is said regarding the infectivity of tertiary lesions, the genesis of which has in the past given rise to such controversy. The authors are to be congratulated upon their book, which is sure to find wide favour, not only with specialists but with those who are engaged in everyday practice.

Syphilis from the Modern Standpoint. By JAMES M'INTOSH, M.D., and PAUL FILDES, M.B., B.C. Pp. 227. London: Edward Arnold. 1911. Price 10s. 6d. net.

THE volume is one of the series of international medical monographs issued under the editorship of Drs. Leonard Hill and Wm. Bulloch. It gives a complete summary of the recent work which has been done on syphilis since the discovery of the *spirochæta pallida*. In addition to the purely scientific aspect of the subject of immunity to syphilis, theories of the Wassermann reaction, etc., a considerable part of the book deals with the use of "606" in syphilis and the clinical value of the drug.

The literature on these subjects is now so great that it is quite impossible for the practitioner to keep abreast of the most recent work by reading articles as they appear in journals. He must therefore rely on those who have made these subjects a special study to give him the result of recent work in a condensed form. This the authors of this volume have succeeded admirably in doing. The book is interesting, not too long, and gives sufficient detail of technique, etc., to make it valuable as a reference book. There are also numerous references under each section, from which further details may be obtained if desired. The half-tone block illustrations are all, without exception, good.

A Practical Handbook of Diseases of the Ear. By WILLIAM MILLIGAN, M.D., and WYATT WINGRAVE, M.D. Pp. 596. With 293 Illustrations and 6 Coloured Plates. London: Macmillan & Co. 1911. Price 15s.

IN this work we have the results of the co-operation between the practical surgeon and the clinical pathologist. We are, therefore, brought abreast of all the most recent advances in otology. Dr. Milligan gives us the results of his own personal experience, and introduces short clinical notes of interesting cases. The first section, which deals with the diseases of the external ear and meatus, is somewhat too long; the numerous skin diseases described really fall within the domain of the dermatologist rather than that of the otologist.

Although Dr. Wingrave's account of the pathology and bacteriology of the various conditions met with is often extremely interesting, it is too diffuse, and tends to break the interest of the reader who has been closely following the account of the clinical conditions. It would perhaps have been better if the pathology could have been concentrated into special chapters.

Chapter XIX., which deals with the examination of aural discharges, is excellent. The drawings, illustrating the microscopic pathology of various conditions, might well have been replaced by photo-micrographs.

It is interesting to note that the authors apparently believe in the possibility of inflammation of the tympanic membrane itself, apart from affections of the external meatus or of the middle ear cleft. Dr. Milligan is greatly in favour of paracentesis of the membrane in cases of acute suppurative otitis media, while he joins the majority of other writers in condemning the use of Bier's method in ear work.

Among the most noteworthy sections of the book are those dealing with tubercular disease of the middle ear and the intra-cranial complications of purulent otitis media. The writers advocate operation in practically all cases of otitic meningitis unless the patient is moribund. In cases of cerebellar abscess they favour the double opening, *i.e.* one in front and another behind the sigmoid sinus, while in dealing with septic thrombosis of the lateral sinus they advocate the ligature of the jugular vein unless the disease in the sinus be extremely localised.

Chapter XXXVI., contributed by Dr. Purves Stewart, deals with diseases of the ear in relation to general medicine. At the end of the work we find an account of diseases of the fauces, pharynx and nose, which extends to 70 pages, and is considerably fuller than that usually met with in text-books on diseases of the ear.

Taken as a whole, the work can be thoroughly recommended to advanced students and practitioners as well as to specialists. It may be hoped, however, that when the second edition comes out the general appearance of the book and the illustrations will have been considerably improved.

Modern Otology. By JOHN F. BARNHILL, M.D., and ERNEST DE W. WALES, Indiana University School of Medicine. Pp. 598. With 314 Original Illustrations. London: W. B. Saunders Co. 1911. Price 14s. net.

THIS work has been mainly written by Dr. Barnhill, but Dr. Wales has contributed the first three chapters and also some valuable pathological work scattered throughout the book.

It begins with an excellent account of the anatomy of the temporal bone and aural apparatus, but the second section, which deals with the physiology of hearing, is rather disappointing, and the account of the vestibular apparatus is by no means up to date.

The functional examination of the cochlear apparatus is clearly described, and the notation given is that of the International Congress at Buda-Pesth, which ought now to be generally adopted.

In their description of the organismal infections of the middle ear the writers have followed German bacteriologists. A noteworthy feature is the clear exposition of the differential diagnosis of furuncle of the auditory meatus from mastoiditis.

The diseases of the nose and naso-pharynx as they affect the ear

are well dealt with, and the classification of inflammations of the middle ear is simple and accurate.

In the chapters on the intra-cranial complications of suppurative otitis media the symptoms and diagnosis of cerebellar abscess are not sufficiently described, while in the section on non-suppurative conditions many useless operations are given in great detail.

Otosclerosis does not meet with the attention it deserves. There is a good chapter on the subject of deafmutism.

The volume is well printed on good paper and is beautifully illustrated. Although not in colour, the illustrations of pathological conditions of the tympanic membrane are very clear, and the photographs of the temporal bone are of a very high order.

The Deaf Child: A Manual for Teachers and School Doctors. By JAMES KERR LOVE, M.D. Pp. 192. Bristol: John Wright & Sons, Ltd. 1911. Price 4s. 6d.

DR. KERR LOVE, undoubtedly the greatest authority in this country on the deaf child, has written a book which is intended for teachers of the deaf, school doctors, and those interested in education and sociology rather than for specialists. For this reason, doubtless, the pathology of deafmutism is not discussed. Chapter V. contains an excellent summary of the information collected by the author on his tour through Denmark, Germany, Austria, and the United States. He describes the different methods of classification and teaching, and states the cost per pupil. With regard to the classification of deaf-mutes, Kerr Love comes to the following conclusions:—(1) The semi-deaf and semi-mute should be taught by the oral method, but separately from the other scholars. (2) The mentally bright deafmutes (other than the semi-deaf and semi-mute cases) should also be taught by the oral method. (3) The mentally dull deafmutes should be taught by the manual method.

The author is also in favour of day schools, and of sending deaf-mutes to school at the age of three years and of retaining them at school until 18 years of age; during the last four years they should be thoroughly taught a trade in addition to continuing their education. The excellent arrangements made by the London County Council for the education of the deaf are fully described. Scotland is very backward in its arrangements, and the author is very much against the mixed or combined method which obtains in Edinburgh.

The book clearly shows that the oral method was originated in Scotland and not in Germany, although it always goes under the name of the "German" method.

The author is an enthusiast for his subject, and in many places he

is really eloquent with regard to the education and training of the deaf child. He comes to the same conclusion as others who have thought over the problem of the treatment of suppurative otitis media amongst poor children, *i.e.* that it is necessary to establish school clinics.

Chapter VIII. gives a good account of lip-reading, while in the appendix there are some interesting and valuable letters from former pupils of the oral schools for the deaf in the United States. Many of these are now in responsible positions, and state that they seldom have any difficulty in reading the lips of others or in making themselves understood.

Finally, the book contains a chapter by Dr. Wright Thomson on the condition of the eyes of deafmutes, and a note by Dr. Kerr Love upon stammering and cleft palate.

Treatment of Neurasthenia by Teaching of Brain Control. By Dr. ROGER VITTOZ. Translated by H. B. BROOKE. Pp. 117. London: Longmans, Green & Co. 1911. Price 3s. 6d. net.

THIS little book is written mainly for patients, and does not pretend to be "scientific"—it deals, indeed, with the training of the will, a faculty which is obviously enough mainly outside the province of "science." The author goes far enough for practical purposes in recognising that the essence of neurasthenia is "want of brain control," and this it is which his treatment aims at restoring. To this end he details several exercises in thought-concentration, beginning with visualising exercises (as of the symbol of infinity ∞ , or the figure 1) and leading on to the methods of securing that healthy mastery of ideation which is essential for the purposes of ordinary living.

An entirely novel view brought forward by the writer is that the movements of the brain corresponding to various psychic processes *can be felt through the skull* as "vibrations," when the physician's hand is placed on the patient's forehead! Our author does not claim that we may read actual thoughts by this procedure, but maintains that we can soon learn to distinguish different mental *states* (such as depression, excitement, dreaminess, etc.). To put it mildly, we would doubt this.

There are some sensible hints in the book (notably those on insomnia), but as a whole it does not show any definite advance on the numerous works appearing at the present day on the psychic treatment of the psychoneuroses. The apparent vagueness of the terminology may be partly attributable to the translation.

A Manual of Fevers. By CLAUDE BUCHANAN KER, M.D.(Edin.), F.R.C.P.(Edin.), Medical Superintendent of City Hospital, Edinburgh. London: Henry Frowde, Hodder & Stoughton. Pp. 314. 6 Plates, 14 Charts. Price 7s. 6d. net.

THIS small manual is the work of a specialist who is a master of his subject—one who also has the faculty of communicating to others his knowledge in a well-ordered, clear, and memorable style. The book begins with a short introduction in which infection, immunity, and fever—its nature, stages, and types—are dealt with; then follows a short chapter on the examination of rashes and throats. The various fevers common in this country, including diphtheria, erysipelas, whooping-cough, and mumps, are systematically described, points of difficulty in diagnosis and treatment are carefully discussed, and the treatment described in detailed and practical fashion.

When considering infection after scarlatina the author expresses doubt as to the possibility of disinfecting the desquamating cuticle by inunction; he nevertheless states that skin undesquamated at the end of six weeks can be safely disregarded. It must be presumed that this statement refers to skin which has been disinfected by inunction, because it is known that the poison of scarlatina, unlike that of measles, is long lived, and that infected articles of clothing which have not been treated retain their infectivity even after a year.

This admirable book is primarily intended for students, but it deserves and is suited for a much wider circle of readers.

Collected Papers of the Staff of St. Mary's Hospital, Mayo Clinic, Rochester, Minnesota, 1910. Pp. 633. With 291 Illustrations. Philadelphia: W. B. Saunders Co. Price 24s. net.

THIS, the second volume of collected papers by the staff of the Mayo Clinic, fully maintains the high standard set by the first collection which we noticed recently. It contains over fifty contributions to matters of present-day interest in surgery, and bears eloquent testimony to the activity of the staff of St. Mary's Hospital. The papers are arranged regionally, and a glance at the table of contents at once indicates the directions in which surgical investigation is tending and the spheres in which most progress is being made. Fully half the volume deals with the alimentary canal, and the greater part of the other half is devoted to the genito-urinary organs and the ductless glands.

We note with pleasure that there is a prospect of the various papers emanating from St. Mary's being collected and issued annually. In this way much of the best work done by American surgeons will be rendered available for ready reference, and these volumes will become indispensable in any medical library, public or private.

Urinary Surgery—A Review. By FRANK KIDD, M.B., F.R.C.S.,
Assistant-Surgeon to the London Hospital. Pp. 429. London :
Longmans, Green & Co. Price 7s. 6d.

BOOKS on special subjects by specialists are often dull and not always instructive, but a review of a special subject by a general surgeon is often both attractive and instructive. Mr. Kidd has succeeded admirably; his book reads easily and convincingly, and the reader obtains the maximum instruction with the minimum of effort. It has the further merit of giving details of treatment, which should prove especially useful to the general practitioner.

BOOKS RECEIVED.

- ALBAN, H. G. *Guide to Gynæcological Specimens in Museum of Royal College of Surgeons of England* (Doran) 6d.
- BINNIE, J. F. *Manual of Operative Surgery* (H. K. Lewis) 30s.
- BRUNINGS, W. *Direct Laryngoscopy, Bronchoscopy, and Esophagoscopy. Translated and Edited by W. G. HOWARTH* (Baillière, Tindall & Cox) 15s.
- BRYCE, ALEX. *Modern Theories of Diet* (Edward Arnold) 7s. 6d.
- CHEYNE, Sir W. WATSON, and F. F. BURGHARD. *A Manual of Surgical Treatment. Vol. I.* (Longmans, Green & Co.) 21s.
- COPLIN, W. M. L. *Manual of Pathology. Fifth Edition* (Churchill)
- DAVIDSON, F. *Sight Testing for the General Practitioner* (F. Davidson & Co.) 2s. 6d.
- DUCKWORTH, W. L. H. *Prehistoric Man* (Cambridge University Press) 1s.
- FRENCH, H. *Medical Laboratory Methods. Third Edition* (Baillière, Tindall & Cox) 5s.
- GUTHRIE, C. C. *Blood-Vessel Surgery* (Edward Arnold) 14s.
- HUTCHINSON, Sir J. S. *Archives of Surgery. Vol. XI.* (West, Newman & Co.) 2s. 6d.
- INTERNATIONAL CLINICS. Vol. IV. (J. B. Lippincott Co.) —
- JOURNAL of Hygiene. *Plague Supplement I.* (Cambridge University Press) 7s.
- LEE, F. S. *Scientific Features of Modern Medicine* (Columbia University Press, New York) 1 dol. 50 cents.
- NISBET'S Medical Directory, 1912 (Jas. Nisbet & Co.) 8s. 6d.
- OPPENHEIMER, CARL. *Handbuch der Biochemie des Menschen und die Tiere. Vol. IV. Part VI.* (Fischer, Jena) 5s.
- PARSONS, F. G., and WM. WRIGHT. *Practical Anatomy. Vols. I. and II.* 17s.
- PERCIVAL, A. S. *The Prescribing of Spectacles. Second Edition* (Wright & Sons) 5s. 6d.
- PICKERILL, H. P. *Prevention of Dental Caries* (Baillière, Tindall & Cox) 7s. 6d.
- TAYLOW, J. CRAIK. *Diet Charts for the Use of Physicians. Part I.* (Horn, Ltd., Glasgow) 1s.
- TRANSACTIONS of the American Gynæcological Society. Vol. XXXVI., 1911 (Philadelphia, Wm. J. Dornan) —
- THE Tuberculins and their Employment in Diagnosis and Treatment of Tuberculosis (Meister Lucius & Brunner, Ltd.) —
- THRESH, J. C. *A Simple Method of Water Analysis* (Churchill) 2s. 6d.
- TUBBY, A. H. *Deformities, including Diseases of the Bones and Joints. Vols. I. and II.* (Macmillan & Co.) 45s.
- WILKINSON, W. C. *Tuberculin in the Diagnosis and Treatment of Tuberculosis* (Jas. Nisbet & Co.) 21s.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

Report of Carnegie Trust.

THE issue of the Report for the year 1910-11 has given the Executive Committee of the Carnegie Trust an opportunity of summing up the work of the Trust during the first ten years of its existence. The control of such large sums of money as are at its disposal cannot have other than a most important bearing on the development of university life in the country. This is evidenced by the facts detailed in the opening paragraph of the Report, in which it is stated that the total income for the ten years has amounted to £1,062,931, out of which £63,546 has been expended on research, £368,288 in grants to universities and colleges, and £445,373 in the payment of class fees for 11,480 individual students.

There are matters of great interest which arise in connection with all three of the branches of the Trust's work. Of these the payment of students' fees attracts most public attention. Whatever views may be held as to the effect on education, there is no doubt that some of the objections are met by the careful way in which the Trust has safeguarded itself by insisting that evidence of a sufficient school education must be produced by every intending student. The most important fact disclosed by the present Report is, however, that the funds available for payment of fees are now fully taken up, and with the numbers now applying only a fixed sum per annum can be paid to each beneficiary, whatever the number of classes he may take.

The Executive Committee foreshadow, however, a new and far-reaching development in university life. They see that it is not only necessary to provide for the payment of fees, but to improve the facilities for subsistence of students while at the university. They are thus in sympathy with the beginning which has been made by the provincial committees and Scottish Education Department for introducing the hostel system into Scottish university life. This sympathy is to be expressed by making loans for the erection of hostels from the reserve fund at a moderate rate of interest. The hostel system is not

entirely new, for the twenty-fifth anniversary of its introduction into Edinburgh has just been celebrated. It is calculated to have effects far beyond those following on the mere increase of comfort and diminution of cost, for it facilitates that contact of individuals, the absence of which has been a defect of Scottish university life and which is one of the most important factors in educational development.

When we pass to consider the effects of the research scheme of the Trust it is no exaggeration to say that a revolution has been here wrought. It has for long been a common criticism that the chief aim of the Scottish universities is to be efficient teaching institutions, and that they have failed to realise their obligations to take part in the advance of knowledge. The obvious retort is that original research can only be pursued if adequate financial backing is available, and it was not until this was provided by the Trust that any development could take place. Though the sum expended here has been relatively small, the results obtained have been very striking, as may be gathered from the bald statement that during the ten years 770 papers have been published by those engaged in research under the Trust. The fact that these contributions came from professors, assistants, research workers, and practitioners indicates the wide distribution of a spirit of inquiry which augurs well for the future of the universities.

The most important and the most permanent effect of the Trust's operation is that which is concerned in providing new buildings and new endowments for the universities, on which, as has been said, nearly £370,000 has been spent. To mention only the chief benefits here—the University of St. Andrews has obtained buildings for chemistry, physics and engineering, and lectureships in French, German, botany, geology, history and economics; Glasgow has had substantial help towards new buildings for natural philosophy, physiology and geology, and endowments for the teaching of geology, mercantile law, English, French, German, bacteriology; in Aberdeen there have been instituted chairs or lectureships in history, French, geology, political economy, German, education, constitutional law; in Edinburgh aid has been given for new buildings in natural philosophy, engineering and physiology, and also endowments for lectureships in bacteriology, diseases of tropical climates, mercantile law, technical mathematics, economic history, and forest botany. As these additions to the equipment of the universities have been obtained by capitalising of the interest, the endowments are permanent and independent of any future changes which may take place in the yearly income of the Trust.

A feature of these grants which cannot but call for comment is the relatively small extent to which medicine has participated in them. No doubt in submitting their claims the universities have been right in hitherto putting forward the needs of other subjects, but taking into account the predominant part which medical education plays, it is not

too much to hope that when the proposals for the third quinquennium come to be put before the Trust during the present year the claims of the most important of the Faculties will be adequately represented.

It is to be recognised that there is one important danger involved in the existence of the Trust, namely, that as a consequence the stream of private benevolence may be diverted from the universities. The Trustees recognise that much is required beyond what they are able to provide, and they say: "We have had it convincingly borne in upon us, in examining the needs and claims of the universities and colleges of Scotland, that in each and all of them much more could be profitably used, and that for want of means regrettable gaps in buildings, staff, equipment, books are waiting to be filled. . . . Indeed it might almost be said that the institution of the Trust has done as much to reveal the needs of our universities as to supply them."

**Organisation of the
Medical Profession.**

WHATEVER may be the ultimate effect of the National Insurance Act on the practice of medicine in this country, there is reason to be thank-

ful that the controversy which has absorbed so much of the time and interest of medical men during recent months has not been without benefit. For the first time the members of the medical profession have realised the necessity for united action, and on the broad general issues raised by the Act they have formulated a definite policy and have made provision for having it carried into effect. This is all to the good, but it is not enough. The conditions of practice vary so widely in different parts of the country, and even in adjoining districts, that it is necessary for members of the profession to be prepared to take concerted action within their own areas on any question that may arise affecting their interests. We learn with satisfaction that steps are already being taken in various districts to consolidate the profession locally.

The medical men residing and practising in Leith, for example, have formed themselves into an association to promote and safeguard the interests of the medical profession and as a means of attaining a common course of action locally on various medical questions. It is particularly gratifying to know that every doctor residing in the burgh has joined the association.

It must be clearly understood that this movement in no sense indicates a breaking away from the general body of the profession. On all matters relating to the Insurance Act these local associations will act in concord with the larger representative organisations, and will adhere to the policy accepted by the profession as a whole. There are many medical questions constantly arising which have only a local interest, and it is eminently desirable that on these the medical men of the district should speak with one voice.

The late Dr. Thomas Proudfoot.

DR. THOMAS PROUDFOOT died at Edinburgh on the 27th of February, aged 69.

In addition to his private practice he acted for some years as Deputy Medical Officer of Health for the Lothians, and was for nineteen years visiting physician to the infectious hospital at Slateford. Well known and respected throughout the city, he was greatly esteemed by his friends for his self-sacrificing and charitable disposition.

As the outcome of his career Dr. Proudfoot had a breadth of view which rose superior to the limitations of professional experience.

Apprenticed, much against his will, in early life to a watchmaker, he spent many years in London, where as a worker he acquired an intimate knowledge of the working man and his ways. This experience was fruitful in many respects, for it enabled him to realise to the full the many difficulties and trials with which the life of the poor and struggling is so frequently beset, and it led him to think much of how the hardness of their lot and the misery of their lives might in some way be mitigated. It was such considerations that weighed with him when, on the death of his father, having inherited a small fortune, he made up his mind to study medicine.

Returning to Edinburgh in 1875 he lost no time in taking his degree, and then set forth to put into practice those views which had been his guiding principles. He found, also, that there was another side to the question—he became alive to the meannesses of that very class the misery of which he sought to relieve. He was bitterly disappointed, but there was no malice in his heart. He at length recognised that things were not as he at one time thought. Despite this he continued to the end to minister to the wants of the afflicted, but he took a different view of life and adopted a much more conservative attitude. His charity was unbounded. Only those who were the recipients of it will ever be able to tell what they owed to him, for no one else was in the secret. In this way he spent more money than he ever earned, and little at the end was left of the small independence he possessed.

No account of his life would be complete without a reference to his exceptional literary attainments. His knowledge of English literature was phenomenal, and his taste in poetry was refined and critical. In matters medical he became somewhat of a sceptic; on some subjects, such as vaccination, he held pronounced opinions, but realising that his views were not always acceptable he kept silence. He lived for others, and even in death was mindful of the claims of charity.

Franz von Winckel.

THE death of Emeritus-Professor von Winckel of Munich, at the advanced age of eighty-five, has deprived obstetrics and gynecology of one of their most trustworthy and exact exponents and investigators.

Von Winckel began his long career at Rostock, and one of the first results of his work there was the publication of a most meritorious book on the *Pathology of Childbed*, still of value to the specialist, and throwing, in one of its chapters, a lurid light on the way in which, even in 1864, hospital labour cases were conducted in Germany.

When von Winckel took over the service of the Rostock lying-in establishment there were two septic cases, and in one of these there were great peritoneal distension and foul discharge, with diphtheritic ulcers at the vaginal entrance. To this patient von Winckel noted on his first visit a student, K., administering an intra-uterine douche, but this did not debar him from manipulation of other cases, with occasional disastrous results. The climax came, however, when K. attended an out-patient in whom he introduced his hand for the purpose of arresting by friction a serious post-partum hæmorrhage. It is needless to give the result to the woman, but after it K. was now forbidden to explore any of the women who were pregnant or in labour, and von Winckel sums up his reasons for this not extreme measure by stating that "K. had frequently touched diphtheritic ulcers . . . arranged the whole collection of alcoholic preparations . . . practised very many operations on a cadaver, and finally had a pustule on the middle finger of his left hand." Now this was in 1864, and yet until von Winckel took charge K. was only under suspicion.

Von Winckel wrote excellent text-books of midwifery and gynecology, and also a most valuable *Atlas of the Naked-Eye Pathology of the Sexual Organs*, of the greatest use in teaching.

In all von Winckel's work there was thoroughness, exactitude, and, where possible, a final appeal to statistics. The questions of the duration of pregnancy and its alleged prolongation were favourite subjects with him, and his contributions to these in Volkmann's *Sammlung* and in the colossal *Handbook of Midwifery* he edited, are of great interest. Von Winckel was the first to describe acute hæmoglobinæmia in infants, and he also discovered the rare condition of emphysematous vaginitis.

In 1909 he published a most interesting work entitled *Allgemeine Gynäkologie*, where he discussed the subjects of the progress of women, the employment of women, and the many delicate points coming up in regard to marriage, prostitution, hysteria, early rising after labour, in an instructive and fascinating manner.

In his long career Winckel saw many changes, and was buffeted by many waves of progress. On the crest of these he rose triumphantly and was never submerged, although he begins the 19th chapter of his *Allgemeine Gynäkologie* with the words, "Alles ist im Fluss, so könnte man jetzt auch von der Geburtshilfe sagen." This chapter specially deals with the present craze for early rising after labour, and on this he makes the sensible remark that it is not a question of

immediate statistics, as, if even with numbers running into hundreds, the point of its safety cannot be settled, "dann wird noch viel Wasser den Rhein hinabfließen, bis endlich Klarheit verschafft wird."

Von Winckel had an essentially exact mind, and viewed advances dispassionately and critically. He had great enthusiasm, tempered by commonsense, and his death will be much regretted by all those who admired him for these qualities, and for his ever ready help to young investigators and students from our shores.

Appointments.

DR. ROBERT CUNYNGHAM BROWN, Medical Officer of His Majesty's Prison, Birmingham, has been appointed a Deputy Commissioner of Lunacy in Scotland in place of the late Dr. J. F. Sutherland.

Dr. John Eason has been appointed an Assistant Physician to the Royal Infirmary.

**National Association for
the Prevention of
Consumption.**

THE Association is actively engaged in forming a library and bureau for the collection of all matters relating to pulmonary tuberculosis from every point of view, and in all countries. It is intended that such information shall be available, not only to members of the medical profession, but to the public at large. Valuable assistance would be rendered if Medical Officers of Health, School Medical Officers and Medical Superintendents or Secretaries of Hospitals, Sanatoria, Tuberculosis Dispensaries, and Open Air Schools would kindly place the Association on their Distribution List in respect of Annual Reports or other documents bearing on the question of consumption. Books, pamphlets and reprints of articles from physicians and social workers in general would also be gladly received.

THE TREATMENT OF TUBERCULOUS PERITONITIS IN ADULTS—A RECORD OF 31 CASES.

By F. M. CAIRD, F.R.C.S.,

Regius Professor of Clinical Surgery, University of Edinburgh.

TUBERCULOUS peritonitis is familiar to us as a disease of childhood and infancy. It is rarer in adult life. Thus in the years from March 1900 to the end of 1910, of 6366 adults admitted to the general surgical wards under my charge in the Edinburgh Royal Infirmary we only met with 31 cases of tuberculous peritonitis in patients between thirteen and sixty years of age. We propose discussing and tabulating these cases, presuming that in every instance definite evidence of the nature of the lesion was established. We exclude *tabes mesenterica*, tuberculous stricture of the intestine, and early examples of tuberculous appendicitis: we include cases showing general invasion of the serous surfaces as the main feature, as also a few in which the Fallopian tubes or ovaries were, in addition, markedly affected, and those in which a general peritoneal tuberculous infiltration seemed to have penetrated from the serous to the deeper layers of the intestinal wall.

The symptoms of tuberculous peritonitis are fairly uniform and well recognised. They are most pronounced in the exudative varieties. The patient complains of swelling of the abdomen, progressive, sometimes slightly intermittent. There is abdominal discomfort and even pain, loss of strength and weight. Constipation is the rule. As distension increases, nausea, vomiting, frequency of micturition and scanty urine appear, respiration and pulse-rate quicken, while temperature shows but little rise, if any. On palpation localised resistant areas and tenderness may be discovered if there be adhesions and infiltrated omentum. The dry varieties exhibit the characteristic "doughy" feeling, and are still more likely to be associated with local tenderness and resistance. When diarrhoea occurs it suggests implication or kinking of the intestine.

The history may assist in diagnosis, as evidenced by the presence of enlarged cervical or axillary lymphatic glands, a tuberculous lung apex, the recollection of a former pleuritic attack, and by information gained as to similar conditions in the immediate relatives. Trauma plays a rôle in determining the local growth of tubercle in joints and other localities, but

it does not figure as calling forth tuberculous peritonitis. Two patients, however, stated that they had sustained a previous abdominal strain. In two women the condition followed closely upon the last confinement. In one case where a patient had made an excellent recovery after operation for gastric carcinoma (pyloro-gastrectomy), and in another more recent instance after ruptured gastric ulcer, both returned suffering from tuberculous peritonitis; yet in neither of them was there any indication of tubercle seen at the previous laparotomy. The characters of the fluid removed at a preliminary tapping, and the microscopic results attained after centrifuging may clear up a diagnosis by the presence of characteristic cells, etc., in carcinoma and tubercle and their absence in ascites. Rarely does cirrhosis of the liver remain hidden, but we have met with one case in which the rapid onset of ascites (without definite liver symptoms) and the presence of von Pirquet's reaction led one to an error in diagnosis.

Sex Incidence.—There were thirteen males from 17 to 60 years of age, averaging 32 years, and eighteen females from 13 to 51, averaging 22 years.

In few cases did the diagnosis present any difficulty, although it must be admitted that some of the more elderly were mistaken for examples of malignant peritonitis, and it is still more instructive that the disclosures in laparotomy so closely resembled diffused carcinoma in every respect that it was only the microscopic examination of portions of parietal peritoneum and nodules that demonstrated the true nature of the pathological process. Naturally the after-history was also corroborative. The findings in abdominal section differ in degree, and consist of a series of types which run into one another, but which may be roughly grouped as follows:—

I. Cases in which fluid predominates—the ordinary exudative form.

IA. The same, plus adhesions, the exudate sometimes encysted.

II. Dry forms without fluid, with or without adhesions.

III. Dry forms in which the peritoneal cavity is practically obliterated or tubercle has invaded the bowel coat, passing from the serosa.

The majority of our patients had already been treated in the medical department without much benefit, and so were referred to the surgical side by the physician. Surgical treatment consisted in an exploratory mesial incision midway between the umbilicus and the symphysis pubis, or, as occasion seemed to

demand, in the linea semilunaris or appendicular region. An attempt was made to find and remove any prominent focus, but no laboured or prolonged search was ever regarded as advisable, and on few occasions were tuberculous tubes and ovaries removed or masses of infiltrated omentum. In such cases, or when the exudate was distinctly purulent, drainage was adopted for a short period. As a rule the abdomen was at once closed after evacuating the fluid and freeing such adhesions as could readily be separated. The dry and adhesive form called for operation on account of localised tenderness and the persistence of general symptoms. It was frequently encountered where one expected to meet with an encysted collection of fluid. Manipulative care had to be exercised on incising the thickened peritoneum, which was frequently almost inseparably blended with adherent intestine. In one patient despite special vigilance the bladder was opened. It lay $1\frac{1}{2}$ inches above the pubes and was fused with the peritoneum. In three other cases the separation of adhesions between coils of intestine—the serosa of which was infiltrated with tuberculous nodules—necessitated a double enterectomy in order to remove large portions of friable gut. These cases made a perfect recovery despite the adverse conditions. Faecal fistula followed simple exploration in two of the purulent cases; one recovered, the other died at home.

Immediate Results of Operation.—Twenty-eight cases recovered. There were three deaths, all amongst the exudative type. Of thirteen males one died—one M. H., No. 30, æt. 18, an emaciated youth, ill for eighteen months, had a huge hour-glass abscess of the lower part of the abdomen and pouch of Douglas, which contained gas and faeces. Drainage and later enterectomies were required, and he sank in four months from general tuberculosis. Two females died—A. B., No. 28, æt. 29, sank on the sixteenth day after operation from general tuberculous peritonitis, tubercle of lung, liver, and spleen; and M. E., No. 23, æt. 17, nineteen days after operation, from general lymphadenitis and peritonitis.

The dry forms, not generally regarded as favourable to surgical interference, all recovered.

It is noteworthy that with the exception of the above fatalities and a couple of patients in whom healing was not followed by marked relief all the others received benefit from operation.

Remote Results.—As may be anticipated it is no easy matter to follow up the after-history nor yet to ascertain the precise cause of death when that has eventually ensued.

Ten of the twenty-eight patients who left hospital healed cannot be traced. Nine died at varying periods: eight are known to be alive and well—one two years after operation, one three years, one four years, four five years, one nine years.

It is mainly by the ultimate result that the value of treatment is to be gauged, and even if our ultimate results are not brilliant they more than warrant the procedure. We have to bear in mind that the general state of patients suffering from tuberculous peritonitis is below *par*; their powers of nutrition and resistance are low, and the subjects referred by the physician for surgical aid have not greatly profited by previous treatment. Hence the mortality is, all things considered, far from excessive. We would not advocate with König that every case of tuberculous peritonitis should be under surgical care, nor yet can we admit with Borchgrevink that no such case should quit the physician's hands. It is only when medical means fail or appear to be of doubtful utility that surgical intervention is required. It would, however, be advantageous to know precisely what success attends the physician in his treatment of a series of cases in the adult. We confess, and are perhaps to blame, that we did not adopt tuberculin or other than general hygienic measures—adjuvants during or after hospital care.

It is doubtful to what extent the dry varieties of tuberculous peritonitis may be regarded as stages in the cure of exudative forms, since we have only met with one instance where there had been a preceding exudate.

The curative effect of laparotomy has been ascribed to various factors. The removal of a passive injurious effusion, thus relieving the general tension, the favouring influence of the succeeding hyperæmia, the outpouring of an active anti-bactericidal fluid, each or all may play its part. That cell proliferation is encouraged appears evident, and amongst other observations one may recall that of Bumm, who had observed the microscopical appearance and the number of bacilli in the tubercles at a certain laparotomy. He had occasion to reopen the abdomen shortly afterwards, and in the tubercles then removed for examination an invasion by lymphoid cells was observed and disappearance of the bacilli.

The following table illustrates the salient features and history of the individual cases:—

No.	Patient.	Age.	Admission.	Previous History.	Present History.	Operation.	Condition found at Operation.	Immediate Result.	After-History.
1.	H. C.	22	23 2 01	Influenza, November 1899, pneumonia and pleurisy left lung 1900.	10 weeks. Abdominal pain, increasing distension and tenderness. Flanks, suprapubic regions dull. Resistant mass left hypochondrium.	9 3 01. Drained.	Much clear yellow fluid. Adhesions, tubercles and nodules like a gravel pit.	Wound granulating.	Faced fistula formed June 1901.
2.	R. H.	37	16 10 01	Pleurisy 4 months ago.	10 weeks. Swelling of abdomen; vomiting; discomfort. Flanks dull.	18 10 11. Closed.	Much clear brownish fluid. Peritoneal tubercles.	Healed.	Not traced.
3.	Miss M. B.	19	3 9 02	No record.	No record.	1 2 02. Closed.	Failed to enter peritoneal cavity. Dense adhesions. Bladder opened.	Healed.	Not traced.
4.	R. W.	21	15 4 03	No record.	No record.	23 4 03. Closed.	No fluid. Dense adhesions, and tuberculous omentum and nodules.	Healed.	Not traced.
5.	Miss C. H.	18	17 4 03	Enteric fever 1902. Frequent diarrhoea.	4 weeks. Abdominal pain. Increasing abdominal swelling.	17 4 03. Drained.	About 3 quarts clear yellow fluid. Much matting of intestines. Both tubes triable. Removed.	Healed.	Excellent health.
6.	Mrs. T.	51	26 11 03	Potts' disease 20 years ago. 17 years' discharging sinus left breast, and 17 years' chronic dyspepsia. Attacks of jaundice, alternating constipation and diarrhoea last few years. Brother and husband died of phthisis.	20 weeks. Increasing swelling of abdomen, pain, albuminuria, swelling of face, hands, and legs.	1 12 03. Closed.	Much free fluid. Peritoneum studded with carcinoma-like nodules. Mass in right ovarian region.	Healed, but not gaining strength.	Deceased.
7.	J. M'C.	17	20 2 04	Satisfactory. Occasional rheumatic pains.	36 weeks. Weak; pain and swelling in right hypochondrial region, which shows a mobile rounded mass.	26 2 04. Closed.	Extra-peritoneal swelling contained pus. Peritoneum covered with carcinoma-like nodules.	Healed.	Deceased.
8.	J. B.	60	16 5 04	Bronchitis 4 years ago.	20 weeks. Vomiting, pain, loss of weight, weakness, swelling in right hypochondrium.	13 5 04. Closed.	Peritoneal tubercles and matting like matting of disease.	Healed.	June 1905 has gained 1 st. 3 lbs. Very well 1907. 22 2 09 hepatic abscess, chronic bronchitis, cardiac failure.

No.	Patient.	Age.	Admission.	Previous History.	Present History.	Operation.	Condition found at Operation.	Immediate Result.	After History.
9.	Mrs. E. D.	29	13 10 04	T.B. glands neck and axilla as child. Recrudescence 6 years ago. Both apices dull.	24 weeks ago. After last confinement progressive swelling of abdomen. Nausea. Flanks dull.	19 10 04. Closed.	Much fluid. Caseating mesenteric glands. Tubercles on omentum.	Healed.	Very well 1 11 05. Not traced since.
10.	Miss B. T.	13	14 2 05	Subject to coughs and colds.	4 weeks. Progressive swelling of abdomen. Weakness, loss of weight. Nausea.	18 2 05. Closed.	No fluid. Mass of adhesions.	Healed.	† 19 5 05.
11.	Miss M. D.	23	6 3 06	Delicate as child. Weak back; running ear. Mother, brother, and sister died of phthisis. Right apex dull.	16 weeks. Dull abdominal pain. Nausea. Increasing distension.	9 3 06. Closed.	2½ pints yellow fluid. Peritoneal tubercles, felt omentum, covered with tubercles. T.B. glands.	Healed.	Pleurisy 6 months after leaving hospital; since well.
12.	J. M.	44	22 4 06	No record.	7 weeks. After strain of abdominal muscles. Pain and great distension. Edema of extremities.	22 4 06. Closed.	Peritoneal tubercles and adhesions. Encysted fluid, pouch of Douglas.	Healed.	Quite well.
13.	Miss A. P.	29	3 10 06	Removal of caecum, etc., in March; end-to-end suture for appendicitis tuberculous.	24 weeks. Loss of weight, weakness, bulging of scar, abdominal pain, and some diarrhoea.	9 10 05. Drained.	Peritoneal tubercles and adhesions. Encysted fluid, pouch of Douglas.	Healed.	† 17 3 07.
14.	Miss L. P.	36	6 11 06	Good till 1904, then sickness and vomiting. Loss of weight. Gastro-pylorotomy for carcinoma 7 10 05.	12 weeks ago. Vomiting and flatulence.	7 11 06. Closed.	Adhesions. Parietal and visceral tubercles. Hyperemic zones covered with tubercles on jejunum and especially on lower end of ileum and caecum. Resection of lower end of ileum. Lateral anastomosis with transverse colon.	Healed.	Not traced. Last record undated, "Doing well."
15.	W. S.	45	3 12 06	Delicate child. Bronchitis. Influenza 8 years ago. Daughter died of phthisis.	12 weeks. Abdominal pain, weakness, loss of weight, constipated, sometimes vomited.	9 1 06. Closed.	No fluid; no adhesions. Villous and sessile tubercles near parietal and visceral peritoneum. Gritty feeling like carcinoma.	Healed.	† April 1906.
16.	Mrs. D. S.	26	9 2 07	Pleurisy 10 years ago, 5 years ago erysipelas.	12 weeks. Abdominal swelling and back-ache; 3 weeks' vomiting; 2 days' biliary tenesmus. Loss of weight. Tapped twice.	13 2 07. Closed.	Turbid fluid, adhesions, tubercles.	Healed.	† July 1907.

17.	Mrs. A. A.	23	8 2 07	Bronchitis in childhood. One brother consumptive.	20 weeks. After confinement, loss of weight, nausea, abdominal swelling. Flanks dull. No tenderness. Friction both apices and bases.	13 2 07. Closed.	20 pints greenish fluid. Peritoneal nodules, suggestive of carcinoma.	Healed.	Pulmonary phthisis 18 months after leaving hospital. No return of abdominal affection.
18.	Mrs. I. W.	22	17 9 07	No record.	28 weeks. Swelling of abdomen, pain, vomiting, loss of weight and strength.	21 9 07. Closed.	A little free fluid. Visceral and peritoneal surface covered with tubercles.	Healed.	Well.
19.	Miss M. A.	20	10 11 07	Indigestion several years.	One year. Abdominal pain, swelling, and tenderness. Diarrhoea, colic, loss of weight and strength. Umbilical deep resistance. Very neurotic.	12 11 07. Closed.	Small intestine matted, fixed posteriorly. Wall of small intestine irregularly matted. No strictures.	Off her head after operation. Healed.	Well.
20.	T. S.	37	13 11 07	Good.	14 weeks. Umbilical pain, nausea, vomiting. A cystic swelling extends from abdominal internal ring along cord.	19 11 07. Laid open; incision extended into abdomen; closed.	Several pints clear fluid. Tubercles in mesenteries and enlarged lymphatic glands.	Healed.	No section.
21.	Miss M. T.	13	17 12 07	Gastric fever 4 years ago. Apical pleurisy 1 year ago.	11 weeks. Abdomen swollen, feverish, constipated. Distended abdomen dull below.	20 12 07. Closed.	Brownish fluid. Tubercles over peritoneum, and oedema of extremities.	Healed.	Not traced.
22.	Miss M. Y.	16	16 1 08	Rheumatic shoulder and side last winter. One brother T.B. glands neck and axilla.	3 years. Progressive swelling of abdomen. Flanks and up to umbilicus dull.	24 1 08. Closed.	No fluid. Thickened parietal peritoneum. Parietal and visceral tubercles.	Healed.	Well.
23.	Miss M. E.	17	25 1 08	Bloodlessness 4 years ago.	Several months ago. Abdominal pain, diarrhoea. Swelling of ankles and abdomen 14 days ago. Nodular masses felt.	28 1 08. Closed.	Much clear yellow fluid. Tubercles over peritoneum, tubes and ovaries.	Healed.	Well.
24.	Miss R. M.	16	23 5 08	No record.	No record.	25 5 08. Closed.	Some clear fluid. Masses of F.B. glands in mesenteries. Pelvic matting.	19 3 08. Section subacute tuberculous lymphadenitis of abdominal glands. Localised tuberculous peritonitis. General	Tapped since, general condition now good.

No.	Patient.	Age.	Admission.	Previous History.	Present History	Operation.	Condition found at Operation.	Immediate Result.	After-History.
25.	S. H.	21	24.12.08	Good.	4 weeks. Dull abdominal pain. Loss of weight. Tumor abdomen. Dull flanks. Mass in right iliac fossa.	30.12.09. Closed.	Cecum and glands form a large confluent mass. Peritonium covered with tubercles.	Healed.	May 1909.
26.	J. C.	56	23.2.09	Good.	28 weeks. Strain of abdominal wall. Angostinos. Epigastric pain, tender abdomen. Resistant mass below umbilicus.	28.2.09. Closed.	No fluid. Matted omentum and intestines. Tubercles.	Healed.	Good health.
27.	Miss L. C.	43	25.4.09	Good.	16 months. Sometimes attacks simulating appendicitis. Palpable tender right iliac mass.	28.4.09. Drained.	Adhesions. Intestinal serosa covered with milky tubercle. Appendix not found.	Faecal fistula. Healed.	Not traced.
28.	A. B.	29	27.5.09	Good.	4 weeks. Sudden sharp pains hepatic region. Shakt jaundice. Loss of weight. Flanks dull. Abdomen tender.	1.6.09. Closed.	Much clear-serous fluid. Omentum (removed) infiltrated with tubercle. Tubercles all over intestine and on tip of appendix.	17.6.09. Section. T.B. peritonitis. Cessation of abdominal glands, more especially at ilio-caecal angle. Tubercle of lung, liver, and spleen.	Good health.
29.	A. C. L.	20	20.10.09	3 years ago T.B. peritonitis. Exudate. 6 months in bed. Treated with Koch's new tuberculin. Recovered.	4 days. Sudden umbilical pain. Vomiting. Doughy abdomen, rather tender below umbilicus.	26.10.09. Drained.	Adhesions. Intestinal serosa infiltrated. Bowel soft and friable. Lacerated. Double enterectomy.	Healed.	
30.	M. H.	18	3.1.10	Erysipelas 9 years ago.	8 weeks. General swelling of abdomen, pain, tenderness. Diarrhoea. Vomiting.	7.1.10. Drained.	Hout-glass cavity leading into pouch of Douglas filled with foetid pus and gas. Exploration of caecal region. Faecal fistula. Enterectomies later.	21.4.10. Section. Tuberculosis.	
31.	Mrs. A. G.	24	6.4.10	Husband T.B.	7 days. Abdominal pain.	7.4.10. Closed.	Fluid. Adhesions. Tubercles in intestine (appendix).	Healed.	Well.

THE TREATMENT OF SIMPLE FRACTURES.*

By CHARLES W. CATHCART, F.R.C.S.,
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IN trying to shape a short paper for the purpose of opening a discussion upon the treatment of simple fractures I have omitted any minute description of the methods to which I shall refer. What we are mostly concerned with to-night are the results of certain methods and their relative value as compared with one another.

For some years after the introduction of antiseptic methods into the practice of surgery the energies of surgeons were expended with such vigour in developing certain new fields of work that other and older fields were allowed to lie fallow. Thus during the period when immense progress was being made in the surgical treatment of diseases of the alimentary canal and nervous system the treatment of simple fractures remained without much change. The subject, however, did not, and never will, lose its interest, for fractured bones are of frequent occurrence, and the consequences often influence the whole of the patient's future life, as is well known.

In later years a stimulus to the search for improved methods of treating simple fractures has been supplied by the Workmen's Compensation Act, in the careful inquiry which this entails, or should entail, into the after-results in fractured bones. Apart from legal obligations the economics of the question must attract our attention—every man unfitted for his work by a broken bone is a loss to the State, and any method which will send men with broken legs back to their work even a few weeks earlier than other methods will save many thousands of pounds per annum.

From a scientific point of view several factors have contributed in recent years to recall the attention of the profession to the healing of fractures. The revival of massage, the careful study of its effects and mode of action, and its remarkable success in the treatment of sprains and bruises, has been one; the revelations of the X-rays have been another, and not least has been the antiseptic method itself. By the impunity with which it permits of the direct inspection and manipulation of the broken bone it has

* Introduction to discussion, Medico-Chirurgical Society of Edinburgh, 28th February 1912.

gradually enlarged the knowledge of the pathology of recent fractures, explained the reasons for the occasional failure of non-operative methods, and opened up a line of treatment peculiar to itself.

At the present time, therefore, the attention of the profession is once more drawn to fractured bones. A committee of the British Medical Association is at present engaged in reporting on the results obtained after fracture of the long bones in many of the chief industrial centres of the country, and our discussion to-night is another indication of the same spirit of inquiry. For the treatment of a recent case of simple fracture, say of the leg, there are three methods available, *i.e.* the old immobilisation method, the massage and early movement method of Lucas Championnière, and the immediate operation method advocated by Arbutnot Lane. My object to-night is to draw out opinion as to the relative merits of these three, so that the general practitioners into whose hands simple fractures first fall may be guided as to which he should employ, or call in others to employ, in any particular case.

1. The old *immobilisation method* consisted in setting the broken bones and fixing firmly with splints not only the seat of fracture but also the joint above and the joint or joints below the broken bone. This immobilisation was kept up until the bone was united. This required a period varying from 3 to 6 or 8 weeks. After that in many cases the limb was enclosed in plaster of Paris for several weeks to allow the union to solidify. On removal of the plaster the patient was told to use the limb. However, great difficulty was generally found in doing so, and a long and tedious convalescence had to be faced to restore more or less completely the functions of the joints and muscles.

The guiding theory in this method was that bony union could not take place if there was the slightest movement at the seat of fracture during the healing process. The theory, however, is now known to be erroneous. Broken ribs heal readily in spite of the movements of respiration, and the success of the massage and early movement treatment has removed any lingering doubt on the subject.

The rigid fixation impedes circulation and so delays union of the bones, while it permits of adhesions to form in and around joints, also between muscles and around nerves. Once these adhesions have formed it is generally difficult and often quite impossible to get rid of them.

2. The *massage and early movement method* introduced by Professor Lucas Championnière. In this method splints are used only to a limited extent, and their object is to prevent displacement, *i.e.* to obviate mal-union, not non-union. They are not, however, discarded altogether, as some suppose. Massage is employed as soon as possible after the fracture, and is continued daily at first and afterwards at longer intervals. The object at first is to relieve muscular spasm and disperse effusion, afterwards to promote absorption of effused blood and lymph and maintain the nutrition of muscles. Combined massage movements of the adjacent joints, both active and passive, are cautiously employed to prevent formation of adhesions in tendon-sheaths and joints, and to maintain the nutrition of the muscles.

The theoretical basis of this treatment is that rapid healing of the broken bone is promoted by the free circulation which is encouraged, while adhesions are prevented and the nutrition of the muscles maintained. Prevention is better than cure. Exact apposition of the broken ends of the bone is considered in most cases to be of less importance for future usefulness of the limb than free use of the joints and muscles. This has been proved to be true by experience in many forms of fracture. The bones heal much more rapidly than was believed to be possible under the older treatment, and the muscles and joints are ready to resume their function when the bones are firm. The objections raised against this method are that it requires more time and attention than the immobilisation method, and that it does not give good results in every case. What these cases are we propose to consider to-night, but in the suitable cases the results amply justify the trouble taken. The principles involved can be grasped, and the manipulations required can be learned, by any medical man, and he can have the treatment carried out in most cases by some sensible friend or relation of the patient, under his direction. Professional masseurs do not generally treat fractures well, and in any case they require special instruction. They are not sufficiently cautious and gentle; but in mining or other industrial centres it ought to be quite possible to have persons available who have been taught to carry out the treatment properly and to act under the local doctor's instructions.

3. The *immediate operation method*. This is recommended by its advocates in most fractures of long bones in children and adults, especially of the lower limb, and in probably the majority of fractures involving joints. Under a rigid aseptic technique the

ends of the bone are exposed, blood clot removed, and the broken fragments adjusted and held in exact position by steel plates fixed into the bone with screw nails.

The theory underlying this treatment is that, in the lower limb especially, restoration of function demands mechanical restitution of the shape of the bone, that without this restitution union is delayed, and that pain is necessarily caused when the limb is used by the altered strains in the bone resulting from the change in its shape.

It may be granted that exact reposition of the broken ends will hasten reunion, but no account is taken of the additional laceration of the soft parts involved by the operation nor of the delay in obtaining functional restoration owing to disuse of the muscles and joints during the healing of the wound. Again, the marvellous adjusting power shown in the process of repair in response to functional demands is under-estimated by the advocates of the immediate operation. This is especially true in the case of fractures in children, and I shall allude to it again when speaking of fractures of the shaft of the femur.

There are two additional points which should also be remembered—one is that the argument for operation is based largely upon the bad results obtained from the old immobilisation method, where the pain of the limb and stiffness of the joints is in most cases due not so much to imperfect restitution of the form of the bone as to adhesions and other changes in the soft parts traceable to the prolonged fixation; the other is that the X-ray photographs taken of fractures before they were plated do not apparently always represent the best position attainable without operation. This leads to a false impression of the mal-position that would have followed non-operative treatment.

The operations on recent fractures require much surgical skill and a thoroughly reliable technique, otherwise bad functional results, amputations, or even deaths are liable to result. This, of course, does not affect the merits of the method in competent hands, but it does make us desire to find a method which is more widely applicable with safety and yet gives satisfactory functional results. Such I believe to be furnished by Lucas Championnière's massage and movement treatment.

The three methods to which I have referred vary in simplicity and ease of application in the order in which they have been placed, and it is important that we should recognise the extent to which the simpler methods may be employed with satisfactory results.

I venture to suggest the following:—

1. The rigid immobilisation method may now be modified since the massage and movement method has taught us that some movement is no obstacle, but rather a help, towards union. We seldom need to secure the joint above and the joint below the seat of fracture unless for the patient's comfort, and the limb may be massaged and the joints moved as often as convenient.

This modified immobilisation method will give good functional results in children in most fractures of the shafts and in adults in the same kinds of fracture (shaft of femur excepted) where there is no great displacement of the fragments nor severe laceration of soft parts. In fractures of the femur in adults, however, prolonged fixation is apt to lead to trouble in the knee, as will be afterwards explained.

2. Massage and early movement, in accordance with Lucas Championnière's directions, gives more rapid results than the modified immobilisation method does in the classes of case to which I have just referred, although the final results may not be much better. It is also the method of choice for fractures near or involving joints, such as fractures of the olecranon, and many fractures involving the elbow in children, so long as they do not require immediate operation (see paragraph 3), and in fractures of shafts with much laceration of soft parts and irregularity at the seat of fracture, so long as there is not much angular or axial deformity nor necessity for complete restoration of length of limb as it is in the lower limb of men in the public services. It is also to be preferred to the modified immobilisation method in fractures suitable for operation where operation is contra-indicated owing to the patient's age or constitution, to local sepsis or to other sufficient cause.

3. Immediate operation where reliable technique is available is the method of choice in transverse fracture of the patella in healthy adults, in joint fractures where the fragments mechanically hinder movement, in cases where the important muscular attachments are torn off and cannot be approximated, where a nerve is involved or soft parts prevent the fragments from coming into contact, or where angular and axial deformity cannot be restored by manipulation or posture, especially in the lower limb, or again where the patient's occupation necessitates walking without a limp, as it does in the army or police force.

In cases such as these adequate operative treatment should be obtained. Sometimes the swelling after an injury makes it diffi-

cult to diagnose the exact seat of the fracture and the position of the fragments. In doubtful cases an X-ray photograph should be taken as early as possible; failing this a careful examination under chloroform is advisable with accurate comparison of the injured and sound limb by measurement, after the best possible restitution.

These general principles will, I think, be sufficient as a guide, and will cover most of the cases. We have no time to take up the treatment of many individual fractures, but it will be useful if I refer to three common forms of fracture, into the discussion of which many of the general principles enter.

1. *Colles' Fracture*.—Reduction in this fracture seems to me advisable not only to minimise as much as possible an unpleasing deformity in an exposed part, but also to re-establish the range of movement at the wrist as fully as possible. When the articular surface of the radius remains after the fracture looking slightly backwards instead of slightly forwards, as it normally does, the wrist in virtue of this alteration acquires an increased range of dorsiflexion and loses some of its range of anteflexion, quite apart from any question of adhesions. A general anaesthetic should be given in most cases. The hand should be extended in the dorsiflexed position and gradually brought forward, while the back of the lower fragment is pressed down and forward by the operator's thumb.

A splint is provided for the anterior surface, either Carr's anterior splint or a wooden splint with a pad to fill the palm of the hand, and the hand and forearm are lightly bandaged to it. A posterior splint is optional. Warm fomentations and gentle massage give relief to pain which is severe at first. Massage to the wrist and forearm applied at the first sitting is repeated daily, the criterion of correct massage being that muscles are soothed, swelling rapidly reduced, and yet no pain caused. Passive movements following the massage are confined at first to the fingers and carried to the wrist as pain subsides. Active movements of the fingers begin about the third day. The splint is discarded in 10-14 days, and the hand removed from its sling in about 3 weeks.

The chief cause of disability after Colles' fracture is the presence of adhesions in the posterior tendon sheaths and in the wrist joint, and these evils very seldom appear when the massage and movement treatment is properly carried out. When they do show themselves in spite of massage and movement they are most

frequently the result of an onset of osteo-arthritis settling down on the injured part. The support to the forearm and wrist are given primarily for comfort and ease, and secondarily to diminish the return of deformity which would be apt to result from spasms of the muscles if the injured part were not supported.

This is a fracture where operation is seldom if ever called for, but where immobilisation is likely to do much harm. It is one in which the massage and movement treatment has given excellent results, and restored to usefulness hands which by the older method would have become permanently stiff.

2. *Pott's fracture* varies much in severity. In most cases it is possible to restore the position of the foot either at once with or without an anæsthetic or within a few days, as the spasm of the muscle subsides under massage.

The deformity which is most apt to be overlooked is that of backward displacement of the foot. This if not remedied will curtail dorsiflexion at the ankle and leave a permanent limp in walking.

The eversion of the foot is more easy to recognise, but if allowed to remain is a source of disability in walking. A strain is put on the ligaments and tendons at the ankle when the patient's weight is borne upon the limb, and this besides causing pain excites a chronic inflammation in the neighbourhood which in turn increases stiffness.

While therefore massage and movement is the method of choice for this fracture an operation may occasionally be called for. Prolonged fixation is apt to lead to stiffness of the ankle.

I generally use a box splint, but when eversion is troublesome Dupuytren's splint is the best, and every now and then Syme's stirrup splint is required to prevent recurrence of backward displacement of the foot.

3. *Fracture of the Shaft of the Femur*.—This is a common injury both in children and adults, but the difference in the results of a similar fracture at these two periods of life is most striking.

In children during the period of growth I do not remember any case where a shaft fracture did not mend with perfect recovery of function. In a recent examination of cases of fracture in the Royal Infirmary 16 cases of fractured femur were presented for examination, all treated without operation by different surgeons and by many different methods. The children's ages when injured had varied from 11 months to 13 years. The results were excellent without an exception.

I prefer the treatment by extension and local splints after reduction under chloroform, combined with massage and early movement—Lucas Championnière's method. Various modifications are permissible, but of this I am satisfied, that operation and plating for a simple fracture of the shaft of the femur in a child is quite unnecessary.

In adults the case is different. The muscles surrounding the bone are massive and powerful, and they swell rapidly from infiltration with blood and serum. Through this thick covering no one can determine the form of the fracture or accurately adjust the ends into alignment even under the deepest anaesthesia, consequently I believe that the accuracy or not of alignment in different cases depends less on the surgeon's skill than on the nature of the fracture. If the fracture is transverse the broken ends will override and be separated by the thickness of the shaft; if the break is oblique the ends although still overriding will lie more nearly in line. In either case some shortening in spite of heavy extension seems inevitable, hence the statement which I made earlier in the paper that some shortening is almost inevitable in fracture of the shaft in an adult.

On the other hand, except in rare cases in which there is interposition of soft parts we may expect bony union, and, given time, the union will become strong enough to bear not only the man's weight but heavy loads besides. The popular belief that the seat of fracture becomes stronger than the original bone seems to be correct, perhaps even more so in cases where there is deformity than where there is none. The strain is a stimulus to the consolidation of the callus which is affected by it, but let us not forget that the greater the strain owing to altered shape of the bone the longer the delay in solidification, and of course also the more the overriding and angling the greater the amount of shortening and limp.

Besides the causes of disability traceable to altered mechanical conditions in the united bone there are others associated with the muscles; one is the involvement of the quadriceps in the callus—this limits flexion of the knee—the other is atrophy of the muscles, especially the quadriceps, from disuse. The resulting weakness prevents the patient from bearing his weight on the injured limb, and the real cause of the disability often escapes observation, being attributed to the bone instead of to the muscle.

These muscular changes will improve under massage and exercise, and in many cases disappear unless where immobilisation has

been continued too long, but even under Championnière's régime steady perseverance with massage and voluntary effort on the patient's part is required for some time after union has taken place. When the patient refuses to make an effort and shirks treatment, as one often finds in workman's compensation cases, the disability will drag on indefinitely.

For my own part in fracture of the shaft of the femur in adults I am not prepared to give up the massage and movement treatment in favour of operation as yet, but I am willing to admit that there seems room for improvement. I have had no opportunity of judging of operative results. In some of my unsatisfactory cases some bending at the seat of fracture has taken place after the patient left the ward. This is the Scylla, of which the Charybdis is stiffness of joints and atrophy of muscles from too long fixation. As the result of experience I hope in future to be able to steer more successfully between them.

Time does not permit me to discuss any other forms of fracture, but I look forward with much interest to the discussion which is to follow, and hope that it will enable us to clear up our ideas on this most important subject.

(The report of the discussion will be found at p. 349.)

TRAUMA AS A FACTOR IN DISEASE.

By ALEX. JAMES, M.D.

II.

To illustrate my meaning let us take the diseases hysteria and neurasthenia, diseases which we at present meet with very frequently following trauma. Studied from the point of view of the trauma these morbid conditions are as regards their causation apt to present specially great difficulties. Owing to the fact that in the mental horizon of the patient, and it must be said also of his relatives and friends, the trauma is apt to loom so largely, our efforts to discover other factors which might throw light on the disease, *c.g.* heredity, constitution, previous illnesses, habits, etc., are apt to be more or less futile. Studied from the point of view of the disease, on the other hand, much more in the way of enlightenment can be obtained. For illustration let us take the diseases hysteria and neurasthenia together and compare them as regards occurrence and frequency with other nervous diseases, *c.g.* epilepsy and chorea. In the annexed table is represented—

(1) The numbers of male and female cases of hysteria and neurasthenia over 15 years of age treated in the Edinburgh Royal Infirmary between the years 1894 and 1909;

(2) The number of male and female cases of epilepsy over 15 years; and

(3) The number of male and female cases of chorea over 15 years treated there during the same periods.

(1) HYSTERIA AND NEURASTHENIA.

	1894- 1895.	1895- 1896.	1896- 1897.	1897- 1898.	1898- 1899.	1899- 1900.	1900- 1901.	1901- 1902.	1902- 1903.	1903- 1904.	1904- 1905.	1905- 1906.	1906- 1907.	1907- 1908.	1908- 1909.
Male .	11	23	23	16		22	16	30	39	99	57	77	63	49	59
Female .	66	60	76	66		59	50	59	70	53	121	121	109	102	104

(2) EPILEPSY.

Male .	27	37	34	24		27	28	18	29	20	41	41	29	22	17
Female .	18	18	9	12		11	19	18	23	15	29	28	22	19	16

(3) CHOREA.

Male .	4	4	3	0		2	4	3	5	2	7	3	6	8	11
Female .	14	10	15	13		13	8	16	10	8	10	14	10	5	20

An examination of these figures reveals that whilst the numbers of epilepsy and chorea cases show variations from year to year, yet remain fairly constant alike as regards males and females,

it is quite otherwise with hysteria and neurasthenia. These diseases show a marked rise as the years go on, beginning in males about 1901 and in females about 1904. But a still more important point is that the female rise is nothing like so marked as the male. Taking for example the first seven years and comparing them with the second seven we find that whilst the number of female cases during the second period is not double that of the first, the number of male cases in the second period is more than three times that of the first. All this is interesting in that it shows that hysteria and neurasthenia are diseases which have been on the increase in the community in a way which chorea and epilepsy have not. With this it is further to be remembered that chorea and epilepsy are both diseases in the causation of which mental shock and physical concussion are known to play important parts. A conclusion to which we are forced is that in the causation of hysteria and neurasthenia there must be something acting as a factor apart from shock or concussion, and that this something must be more potent in males than in females. But next a glance at the table will show that this something must have begun to act before the year 1901, and bearing in mind that introspection is very important in connection with hysteria and neurasthenia, we cannot but infer that to the introspection and morbid mental condition generally induced in the average man by the Compensation Act of 1898 a share in this rise must be ascribed.

But again, viewed from the disease rather than from the trauma aspect investigation cannot fail to bring home to us a further consideration. This is that whilst on the one hand trauma and even slight trauma may exercise most harmful effects months or years after its occurrence, yet on the other trauma may be not only a very subordinate and secondary cause of trouble but it may even present a salutary aspect, inasmuch as it may act simply as a danger-signal. Physicians not infrequently witness a slight bruise or sprain, and the neuritis or other trouble which it precipitates acts as the danger-signal for diabetes, gout, rheumatism, or over-indulgence in alcohol. Similar illustrations present themselves from time to time in heart and lung cases, and I have more than once seen a pigmentation about the site of an old burn or an old blister-mark reveal an impending Addison's disease.

Still another advantage which the study of this subject from the disease aspect offers is that it makes us best realise the limitations of medical knowledge. Between disease and health,

bodily or mental, as between anything else in Nature, there is no hard and fast line. We physicians have, therefore, the greatest difficulty in determining what is functional and what is organic in bodily disease, and indeed we often find it impossible to do this. But when we are dealing with the factors of disease, and when this brings before us the consideration of the mental aspect adopted by the subject of the trauma and the influence of this on his symptoms and health, our difficulties are intensified enormously. Indeed when we assert that it is only at the very rarest intervals that we can draw the line between neurasthenia or hysteria on the one hand and pure and simple want of grit or pure and simple malingering on the other we are only telling the truth.

In this way, then, I have in the following pages endeavoured to treat the subject of trauma as a factor in disease purely from the disease point of view. I have culled my descriptions mainly from my Infirmary case books, and very sparsely from my records of diseases caused or alleged to have been caused by trauma; these latter, indeed, I refer to only incidentally. I have limited my narrations even further than this, for I have left out to a large extent the cases of gross lesion to viscera from falls from a height or very severe crushes, the broken backs, the ruptured viscera, the torn nerve trunks, etc., in all of which the connection between the trauma and the patient's condition was as clear as the results of the trauma were disastrous. In this way as material to help us in the understanding of trauma as a factor in disease their study would be really superfluous.

Proceeding now to the consideration of the diseases in detail I, in the first place, select for comparison—(a) locomotor ataxia; (b) lateral sclerosis of the spinal cord, disseminated sclerosis, and diffuse forms of spinal sclerosis; (c) progressive muscular atrophy and chronic anterior poliomyelitis; (d) bulbar paralysis; (e) paralysis agitans.

In the records of cases these can all be recognised as distinct groups.

(a) *Locomotor Ataxia*.—Of 40 men affected with this disease 10 gave a history of accident or accidents; of these 10 in only one had the accident any effect on the disease, and this was evidently little more than a slightly aggravating one.

James F., aged 45, a miner, was admitted 12th November 1892 complaining of lameness and weakness in the right leg,

of numbness and tingling in both legs, but more especially in the right, and of shooting pains in both thighs. He stated as the duration of these complaints 5 weeks.

His family history was good; he had always had good food and been well housed; he denied specific disease, but his wife had had 5 still-born children. He had not always been temperate.

Accidents.—(1) Left leg broken by a fall of coal 12 years ago; (2) a mass of coal fell on the small of his back about 10 years ago, but he was able to work a day or two after; (3) a mass of coal fell on his right side just above the iliac crest 5 weeks ago, and since then he states he has walked lame and has been unfit for work.

On examination we found him to present the symptoms of locomotor ataxia in a fairly well-marked form. The lightning pains had begun 9 years ago, and for some years past he had had bladder trouble at times, and his legs had been rather “stumpy” in walking. He had had *tic douloureux* severely about 2 years ago. *Rombergism* was present, but not very markedly, and he had been working as a miner up to 5 weeks previously.

In this man's case the injury had had little more than a slightly aggravating effect on the disease. During his stay in hospital there was noticed what one would expect in such cases, *viz.* that the evidence of the disease had become rather more marked in the injured part. In his right leg the pains, and specially the lightning pains, were more complained of, and the stamping ataxic movement in walking was more pronounced in it than in the left.

(b) *Lateral Sclerosis, Disseminated Sclerosis, and Diffuse Forms of Spinal Sclerosis.*—Although clinically distinct examples of one or other of these spinal conditions often present themselves, yet in dealing with them statistically they are not so readily distinguishable from one another, I therefore have arranged them all in one group.

Of 40 men affected by one or other of these forms twelve gave history of accident or accidents. Of these twelve in eight was the trauma indicated by the patient or his friends as having had a possible or probable connection with the disease; in two of the eight the accidents were simply strains.

James B., aged 45, a pit-sinker, was admitted 16th June 1896 with a form of spinal sclerosis. His family history was good, and

he had had no previous illnesses. His work entailed continuous exposure to wet, and he gave a history of as continued alcoholic excess. Some weeks ago, when drunk, he fell from a height about 10 feet, landing on his shoulders and on the back of his head, into what was, however, soft ground. He had to be carried home, all his limbs having been apparently more or less paralysed, although he says he was not unconscious, and retained command of his bladder and rectum.

In the course of about a fortnight the power had returned, but four months afterwards some slight persistent sensory impairment and marked voluntary motor impairment, with great increase of arm and leg reflexes and clonus, led us to diagnose a form of lateral sclerosis following concussion.

In this case the accident was causal, but it is probable that but for his constitution and habits the results would not have been so grave and persistent. It will be noticed that the symptoms of the sclerosis directly followed on the accident.

Alexander L., aged 57, a miner, was admitted 28th August 1895 affected with a form of cerebro-spinal sclerosis. His family history was good; his home surroundings and habits were satisfactory. He had had no previous illnesses, but had had several accidents. The last and most serious of these occurred 6 years ago. As a result of a fall from the roof in the mine his head was injured, so that he was rendered quite unconscious, and remained so for six weeks. Gradually his memory and speech recovered, but they are still defective, as also is his voluntary motor power.

On admission, with impaired voluntary motor power in all the limbs, there is marked increase in the tendon jerks, ankle, knee, triceps, biceps, and supinators, with marked ankle and knee clonus. There is also slight thickness of speech and memory impairment.

Here the accident was causal, and precipitated the senile changes which in a man doing the work of a miner are prone to be impending in the sixth decade. In this case it is impossible to say how long it took for the sclerotic symptoms to supervene upon the accident. He had never felt fit for work after the accident, and from all accounts this unfitness had been genuine.

Peter M., aged 36, a wire-worker, was admitted 26th November 1896 complaining of weakness in his legs, which had begun 3 years before.

His heredity was vague, his habits as to food and drink were

irregular, and in tramping about the country he had been much exposed to cold and wet. He gave a long history of alcohol, but he denied and presented no evidence of specific disease.

Accidents.—(1) When a child his right hand and right foot and his head were all injured by being run over by a cab. (2) Eighteen years ago he was injured by a severe kick on the testicles. (3) Four years ago he fell against a grate, gashing his upper lip and chin. (4) Three years ago he was injured by a heavy barrow falling on his right leg.

Since his last accident the weakness in the legs has been progressive. On examination we found evidence of sclerosis both of the lateral and posterior columns. He had impaired voluntary motor power in the legs, with some sensory impairment as well, lessened knee jerks, some inco-ordination and bladder disturbance.

From his description it seemed as if the accident had been a causal factor, but there could be no doubt that his rough life and habits together formed factors of much greater importance. As to the period of time in this case between the accident and the development of the sclerotic symptoms it is impossible to speak definitely.

Allan B., aged 24, a rubber worker, was admitted 12th May 1902 complaining of weakness and unsteadiness in the legs of about a month's duration.

His family history was not very good, and he had not always been temperate. He gave no history of specific disease.

In April 1901 he was knocked over by a cab. A wheel of the cab had grazed his head, and in falling he told us that his legs were twisted, as it were, round each other. He sustained some bruises on the legs and head, still he was able to walk home unassisted. For some days he felt none the worse, but as the weeks passed by he noticed himself walking unsteadily; he therefore applied for admission.

In this man, as time went on, nystagmus, speech trouble, tremors, increased reflexes, and clonus became more and more marked, so that a diagnosis of disseminated sclerosis was arrived at in the course of two months. As regards the accident our opinion was that whilst it certainly had had to do with his disease, yet that the patient's constitution and habits had been the more important factor.

Robert H., aged 49, a coach-painter, was admitted on 14th November 1901 suffering from a form of disseminated sclerosis.

His family history was not very good. His mother after a long residence in an asylum died there, his father died about 60 of some chronic nervous disease, and he is the only survivor of a family of 3. His home surroundings were good; he had been very temperate, and told us that a small glass of whisky had always made him feel shaky in the limbs and giddy in the head. About 5 years ago he seems to have suffered from lead-poisoning, and about 4 years ago he racked his left side at his work, and was on the sick list for a week. This, with the death of a child which happened soon afterwards, brought on his present illness. At present the indications of lead-poisoning are not marked, but the weakness, jerkiness, inco-ordination, increased reflexes and clonus, giddiness and staccato speech led to a diagnosis of a form of disseminated sclerosis. He is also distinctly emotional. In this case the accident was of little or no importance; the condition was due to constitutional and general causes.

John M., aged 28, a miner, was admitted 23rd November 1905 complaining of weakness in the legs and back of 8 months' duration. His heredity appeared good and his family history and surroundings satisfactory. As regards previous illnesses he had had scarlet fever when a child, and had been operated upon for varicose veins in the leg some years before.

His present illness, he stated, dates from an accident in the mine on the 21st of March previously. Whilst lifting a hutch on to the rails he strained his back. He felt giddy at the time, but was able to finish his work and to walk home with some difficulty. He has not been able to work since. He noticed more and more difficulty in walking and a numb feeling in his legs. His eyesight also appeared to be failing.

On admission we found indications of disseminated sclerosis, with some slight disturbance of sensation in the legs. With fair voluntary motor power and a somewhat spastic gait he had exaggerated knee and ankle jerks, knee and ankle clonus, lateral nystagmus and commencing optic atrophy.

In this case the factor alleged was simply a strain, the result of voluntary effort, and we regarded it as having had little causal influence.

The next two cases are typical examples of disseminated sclerosis, but they are quoted in this group as indicating the possibility that the low trophic constitutional power which deter-

mined the disease may yet have been still more lowered by the trauma. In both the trauma was distinctly severe.

Robert B., aged 26, a civil service employee, was admitted 14th January 1901 suffering from disseminated sclerosis. His family history was fairly good, and his present illness had been noticed for some six months. As regards accidents he gave a history of having been knocked down by a spring van and kicked by the horse when 7 years old; he had then been unconscious for 24 hours, and had bled from the left ear. Since then he had been well until his illness began some six months before.

This was a typical case of disseminated sclerosis. His family and personal history appeared good, but he was constitutionally rather neurotic. This constitutional weakness may have been aggravated by the accident in childhood.

James T., aged 26, a dock labourer, Leith, was admitted 6th January 1901 affected with disseminated sclerosis. His parents both died of tubercular mischief in comparatively early life, and his habits have not been satisfactory. His present illness seems to have begun about a year ago, but it was elicited that 7 years ago a heavy weight had fallen on his back, laying him off work for several days.

In this man's case also the disease was due to constitutional causes, but it is quite conceivable that the accident may have to some extent precipitated and accentuated its onset.

The comparison at this stage of locomotor ataxia on the one hand with lateral, disseminated, and other forms of spinal sclerosis on the other is interesting as showing the much more important part ascribed to trauma in the latter diseases than in the former. For this there may be several reasons. One probably is that the motor tracts are really more vulnerable to shock and concussion than the sensory, because genetically they are later in development. Just, for example, as in brain concussion the nerve channellings of recent experiences often get knocked out when those of older experiences remain intact, so in cord concussion damage to the relatively newer motor tracts is much more apt to occur than to the older sensory.

Another reason may be that it is so because a patient in the earlier stages of ataxy will have at least some of his afferent nerves blocked, and therefore may be less sensitive to peripheral injury. But it seems to me that there may be still another reason.

A perusal of my hospital records indicates that on the whole the ataxic patients could point to a better heredity and could show a sturdier physique—or the remains of one—than could the patients suffering from other forms of spinal sclerosis. May it not therefore be the case that the same exuberant virility which tends to lead a man to acquire the determining factor of his ataxy, viz. syphilis, may lead him also to resist more vigorously the morbid effects of shock and trauma? At any rate when one reads the story of the ataxic Larry Tighe in Kipling's *Many Incentions* one cannot but feel that whatever might be the illness which compelled a man of this type to go to hospital, it would certainly not be neurasthenia.

(c) *Progressive Muscular Atrophy and Chronic Anterior Poliomyelitis*.—Of these conditions I have records of eighteen cases. Five of these had had accidents at one time or another, but in only two was a causal relationship indicated.

Edward D., aged 21, a labourer, was admitted 1st July 1899 affected with great wasting and weakness affecting the arms, shoulder girdle, neck, and lower face. His family history is not very good, but he gives no history of similar condition in any of his relatives. He gives no history of previous illness. As regards accidents his left elbow was dislocated 8 years before, and about 3 years before his left eye was injured, and now shows traumatic cataract. His symptoms showed themselves about a year before his admission, i.e. about seven years after the elbow accident, by weakness in the hands and arms, more especially and more early in the left. This and the wasting now involve the neck muscles to such an extent that in sitting he can hardly balance the head on the condyles. The trunk and leg muscles are as yet much less involved, but he says that in mastication there is a tendency for food to lodge between the teeth and cheeks. The affected muscles show no tremors.

In this case the disease factor was a constitutional one, but the accident may have had some slightly aggravating influence on the development of the disease.

Charles B., aged 24, of no occupation, was admitted 15th October 1894 affected with muscular wasting in the legs and arms and great loss of power of some ten years' duration. He had been in hospital 6 years previously as a case of muscular atrophy. His family history was good, showing no hereditary

tendencies. As regards previous illnesses he had had scarlet fever, followed by nephritis, at the age of 2. At the age of 4 he stated he had had something wrong with his left eye, for which some operation was performed, but he cannot give further information about it, and his sight, etc., is normal. When 6 years old he had measles. When about 10 years old he had fallen downstairs, injuring his head. He was in an unconscious condition for one day, but states that he felt all right shortly after. When about 15 years of age, *i.e.* 5 years after his fall, he noticed that the flexor muscles of the right thigh began to contract and draw the leg into a half-flexed position, and shortly after he noticed that the muscles of the right leg and thigh began to waste. This wasting, with corresponding weakness, soon extended to the left leg, and thence to the arms. This condition has gradually got worse, so that now in the legs the wasting of leg, thigh, or gluteal muscles is extreme. As regards the arms a similar condition exists, and in the hands the wasting of the thenar and hypothenar muscles and the interossei is very marked. In all the affected muscles fibrillar tremors have shown themselves. Lately he has noticed at times a little trouble in deglutition, but the neck and face muscles appear fairly good. Within the past few years he has also had a slight cough, and there is some dulness at the right apex. He has also had two attacks of pleurisy, 6 and 4 years ago respectively.

In this case again the disease was constitutional, but the accident may have had some deteriorating effect on the constitution.

It will be noticed that out of these eighteen male cases of progressive muscular atrophy and chronic anterior poliomyelitis the only two patients in whom accident has been quoted were not typical cases of progressive muscular atrophy. The first, Edward D., we regarded as one of chronic anterior poliomyelitis, the second, Charles B., as one of muscular dystrophy.

(d) *Bulbar Paralysis*.—Of bulbar paralysis I have records of only eleven cases. Two of these had had accidents, but in only one was the accident indicated as having had anything to do with the disease, and this, it will be noticed, was a case of acute bulbar paralysis.

George T., aged 45, a miner, was admitted 16th June 1902 affected with an acute form of bulbar paralysis. His heredity was not very good; his home was comfortable, but at work he was

much exposed to cold and wet ; he had also been a heavy drinker. His accident had occurred in the previous December. His right arm was broken, and his right leg was so injured that amputation had to be performed. This operation had been done in the Royal Infirmary, and he had been dismissed convalescent in April 1902.

His present illness had begun in the following May ; he had been sitting on wet grass and contracted a chill. He was not acutely ill, but seemed to be becoming weaker, bodily and mentally, so that, as his friends said, "he could not do anything for himself." Then about a fortnight ago he quite suddenly lost the power of articulation, and this was accompanied by difficulty in deglutition, so that the food regurgitated through his nose.

Four days before his admission on 12th June great difficulty in breathing showed itself, and this and the difficulty of obtaining proper treatment at home led his friends to seek admission for him to the Infirmary.

On his admission on 16th June he was evidently very ill, temperature 99·6, pulse 154 per minute, respirations 40 per minute. There was complete paralysis of tongue and lips, and he was greatly distressed. He was put to bed, hot-water bottles applied all round him, and strychnine given, but he rapidly became worse. The pulse became more rapid, weak, and very irregular. The respirations, keeping rapid, stopped at intervals, so that artificial respiration had to be performed. He became more and more cyanotic, and mucous accumulated in the throat. Oxygen inhalation and swabbing out the throat relieved him slightly, but with weakening of the pulse and slowing and shallowing of the respirations he died about 2 A.M. on the following morning. No sectio was obtainable, but I was inclined to think that the lesion was a softening due to debility and some toxic condition.

As to the part which the accident played in his condition it is impossible to speak definitely. Except that he had been very alcoholic little information as to his previous life could be obtained, and owing to the gravity of his symptoms on admission we could ascertain little else than that his heart, lungs, liver, and kidneys showed no distinct evidence of organic disease.

His case was one of those which we meet with too frequently, viz. that of a man taking an illness—in this case a chill—which, from his age and healthy appearance he should struggle through quite successfully, yet succumbing to unexpected developments as the result of previous alcoholic excess.

(e) *Paralysis Agitans*.—Of this disease I have records of fifteen male cases. Three of them had had accidents of one or other kind, but in only two was there a possibility of its having brought on the disease. One of these was that of A. W., in which the disease was ushered in by nerve shock (p. 244), the other is the following:—

John D., aged 59, a gas-meter maker, was admitted 21st January 1899 suffering from paralysis agitans. His family history is fairly good, his home surroundings are comfortable, and he is moderate as regards alcohol and tobacco. He has had no serious illnesses since the one about to be referred to. Twenty-six years ago the ring finger of his right hand was poisoned, he says, with red lead, and the swelling and inflammation extended up the right arm, so that several openings had to be made along the forearm, and the ring finger had to be amputated. He had been treated in the Infirmary for several months at that time. He says his right hand has been rather shaky ever since, but it was only about a year ago that the shakiness of it became so marked as to interfere with his work and to extend to his left arm. He can give no explanation for this extension, unless it was exposure to cold and some slight articular rheumatism.

In this patient also that condition of premature and intense senility of nerve tissue which as has been already mentioned is the essential of the disease, paralysis agitans, may possibly have been accelerated in its onset by the long-standing morbid condition of the right arm.

TUBERCULOUS INFECTION IN INFANCY AND CHILDHOOD, AS REVEALED BY THE CUTANEOUS TUBERCULIN TEST: AN ANALYSIS OF 541 CASES.

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IN the last few years evidence has been accumulating that tuberculous infection is a much commoner event in childhood than has been supposed, and that in addition to the mass of active and clinically apparent tuberculous disease among children, considerable though that is, there exists a large amount of latent tuberculous infection. The proof of this concealed or latent tuberculosis among children has been gathered from two sources—from post-mortem statistics and from the use of the tuberculin tests on the living.

The following table of post-mortem findings of tuberculous lesions is taken from Kelynack, and refers to deaths from all causes among children up to the age of fifteen years¹:—

Place.	Author.	Percentage of Tuberculous Lesions.
Christiania	Harbitz	42·5 per cent.
Vienna	Hamburger and Sluka	40·0 "
Paris	Comby	38·5 "
London	Still	35·0 " (up to 12 years)

These figures, collected from widely separated European capitals, showed a close correspondence and demonstrated a far higher percentage of tuberculous infection than is revealed by purely clinical statistics, but at the period at which they were compiled it was not possible to check them in the living by the available methods of clinical investigations.

But the discovery of the local and general tuberculin reactions, and their application to clinical diagnosis as the ophthalmic (Calmette) and cutaneous (v. Pirquet) reactions, gave the opportunity of obtaining clinical statistics and of comparing them with those post-mortem data.*

* One might also mention the inunction or percutaneous test of Moro and the blister reaction of Woodcock. These with the cutaneous reaction of v. Pirquet are simply modifications of the original subcutaneous or "Stich" reaction of Escherich.



FIG. 1.



FIG. 2.



FIG. 3.

The results in the present investigation were entirely obtained by the cutaneous reaction, which it is now generally agreed is both a safer and a more delicate test of tuberculosis. My main object, by performing the test on children of all ages suffering from every variety of disease or in apparent good health, was to ascertain the amount of tuberculous infection, latent or active, in the child population, and also if possible to discover the incidence of this tuberculous infection at the various age-periods of childhood. Incidentally this has thrown some light on the value of the test in diagnosis of the various clinical forms of tuberculosis. Other subsidiary points were kept in view, and will be dealt with in the course of the paper.

Technique.—Undiluted old tuberculin of Koch was used and was applied to the skin as follows:—A small circular area of epidermis was chafed off with the point of a needle, care being taken to avoid bleeding. On this denuded area of corium the head of a darning needle charged with tuberculin was pressed in with a rotary motion, forming a small bruised pit from which the fluid was rapidly absorbed. This method is similar to that recommended by v. Pirquet, with the exception of the preliminary removal of epidermis. That apparently trifling modification was, however, found by me to increase the sensitiveness of the reaction, and in five out of seven cases produced a positive result where the method of v. Pirquet failed.²

A second point is of great importance. Undiluted old tuberculin was used throughout except in the first 78 cases, where a 25 per cent. solution of the old tuberculin was used. The latter was the strength recommended by v. Pirquet himself in his original paper,³ though he later recommended the use of the undiluted preparation. Now, with the diluted solution the reaction is always feebler than when the concentrated tuberculin is used, and it even may be absent altogether. Both these points, the diminished and the absent reaction, are shown in Figs. 1 and 2. Mills,⁴ in a recent analysis of the cutaneous test in 253 children, where he used a 20 per cent. solution of old tuberculin, found negative results in 48 healthy children, whose ages ranged from 9 months to 12 years, and concluded that “a negative reaction may be confidently expected in children apparently non-tuberculous.” I myself in a previous series,² using a 25 per cent. solution, obtained negative results in about 50 children suffering from diseases clinically non-tuberculous; but this experience has been completely falsified by the use of the undiluted tuberculin,

as the present paper will clearly show. It is very necessary to insist on this point, as most commercial firms in this country still prepare tuberculin for the cutaneous reaction in 25 per cent. dilution. How much error is introduced by the use of the weak tuberculin it is not easy to say. Wherever the reaction to the pure tuberculin is definitely pronounced I am inclined to believe that it will also be visible with the dilute preparation, but in cases of feeble reaction the weaker solution will fail in many cases. With undiluted tuberculin the result is definitely positive or negative in 24 hours in the great majority of cases. Delayed reactions (48 hours and over) are much less frequent with its use than with diluted solutions.

In all the cases performed in the Sick Children's Hospital control applications of glycerine were used. As these were always negative they were dispensed with in the second series (see later, Group B).

It may be well very briefly to give evidence that the cutaneous reaction to tuberculin is a specific test of tuberculous disease, whether apparent or concealed. In the clinic of Escherich at Vienna up to 1909 post-mortem examinations had been made on 300 children in whom the v. Pirquet reaction had been positive during life.⁵ In 297 of these, or 99 per cent., a tuberculous focus, demonstrable to the eye, was discovered. In the remaining three cases an emulsion of lymphatic glands from one produced tuberculosis in a guinea-pig on injection; in the other two no further search for tuberculosis was made. Evidence of the same overwhelming kind has been obtained from other sources.

The test was performed in 541 cases in all, the ages ranging from a few weeks up to fifteen years.

The cases may be taken in two groups, which for convenience may be termed A and B.

Group A numbered 371 cases from the Royal Edinburgh Hospital for Sick Children, the age-periods ranging from birth up to 12 years. They were not selected in any way, but were taken systematically from all the medical wards of the hospital. The series was, however, not consecutive, being interrupted from time to time. It naturally includes a number of tuberculous cases, but no attempt was made to secure a large number of these, or of any other clinical condition. Group A, then, forms a representative group of the in-patients of the hospital. The majority of these patients are drawn from the poorer classes of the population,

chiefly of Edinburgh, though to a certain extent also of rural districts. The group may therefore be taken to represent that portion of the poor child population which is least healthy, being either subject to disease or suffering from it.

Group B numbered 170 cases from a boys' industrial school near Edinburgh containing 178 boys. These boys are drawn from the very poorest classes of our town populations (chiefly Edinburgh and Dundee), and have spent infancy and childhood in the worst conditions of squalor and destitution. The age-periods of this group ranged from 6 to 16 years, but the great majority were 10 years and upwards. The general and hygienic conditions of life at this school were satisfactory, and though the boys were somewhat stunted in growth they were well nourished, and at the time of examination appeared in vigorous health and showed no signs of disease. This group represents a class unusually exposed in early childhood to influences predisposing to disease and to direct infection, but later placed in much more favourable conditions of life, and indeed more shielded from infective processes than the ordinary poor population of the same ages. Positive reactions in such a group would indicate latent as against apparent and active tuberculosis, and remote rather than recent infection. That the conditions at this school do not favour an active type of tuberculous disease is shown by the fact that the medical entries for the last 20 years record only 7 cases of pulmonary tuberculosis and 5 cases of other clinical forms of tuberculosis. This small incidence of active tuberculosis is all the more remarkable considering the previous conditions of life of the boys and the large amount of latent tuberculous infection which the cutaneous tuberculin test revealed. Group B therefore gives results from the very lowest class of our town populations in the later years of childhood and in early adolescence, but these results must be regarded as retrospective to earlier childhood and infancy. The members of this group (boys alone) differ also from those of Group A in that they were apparently free from active disease.

The results of the cutaneous test were as follows :—

	No. of Cases.	Percentage of Positive Results.
Group A and B	541	44·5
Group A	371	37·7
Group B	170	59·4

Group B, with a percentage of almost 60, shows a marked increase over Group A with less than 40 per cent., which is all the more striking in that the latter is a sick population, and therefore more likely to concentrate in it cases of tuberculosis, both latent and active, while the former is a group of apparently healthy boys. But before this conclusion can be accepted it will be necessary to analyse the groups into age-periods; for if there were a large number of children in Group A at an age-period when the amount of tuberculous infection was small, this would reduce the total percentage of the group, and vitiate its comparison with Group B, consisting of much later age-periods.

Groups A and B Arranged in Age-Periods.

GROUP A.			GROUP B.	
Age-Period.	No. of Cases.	Percentage of Positive Results.	No. of Cases.	Percentage of Positive Results.
		Per cent.		Per cent.
I. Under 1 year .	64	14.1	...	...
II. 1-2 years .	61	29.9	...	...
III. 3-4 years .	75	46.6	...	...
IV. 5-6 years .	52	28.8	...	...
V. 7-10 years .	79	51.9	21	38.1
VI. 11-14 years .	40	55.0	81	60.5
VII. 15 years .	...	...	68	64.7

Before proceeding to an interpretation of these figures it must be admitted that the numbers in the various age-periods are small and will not safely carry wide conclusions, but for the most part they are approximately equal.

Dealing with Group A, I would make the following deductions:—

1. Tuberculous infection is already apparent as a chronic process during the first year of life. Of the 9 positive results obtained in this group, 7 were in children not clinically tuberculous. The total amount of tuberculous disease at this period is really higher than is indicated by the figure in the table, for to it would have to be added several cases of tuberculous meningitis and general tuberculosis in which the reaction failed.

2. Tuberculous infection rapidly increases during the second and practically reaches a maximum during the third age-period: that is, during the fourth and fifth years of childhood. The variations in the subsequent age-periods, the considerable drop

in the fourth, where the numbers are smaller, and the slight rises in the fifth and sixth may be discounted with these small figures.

3. If these figures should be supported by larger statistics, we are brought to the conclusion that nearly half the children that seek admission to this hospital are infected with tuberculosis *before school age*, and that the amount of tuberculosis, latent or active, at later periods may not be due to any appreciable extent to fresh infection during the period of school; in short, that the great proportion of tuberculous infection is effected in the first five years of life.

The results in Group B are not inconsistent with these conclusions. In Age-Period V. (7-10 years) the number is too small to be of value, and in the two subsequent periods, where the numbers are more adequate, the result is roughly 60 per cent.

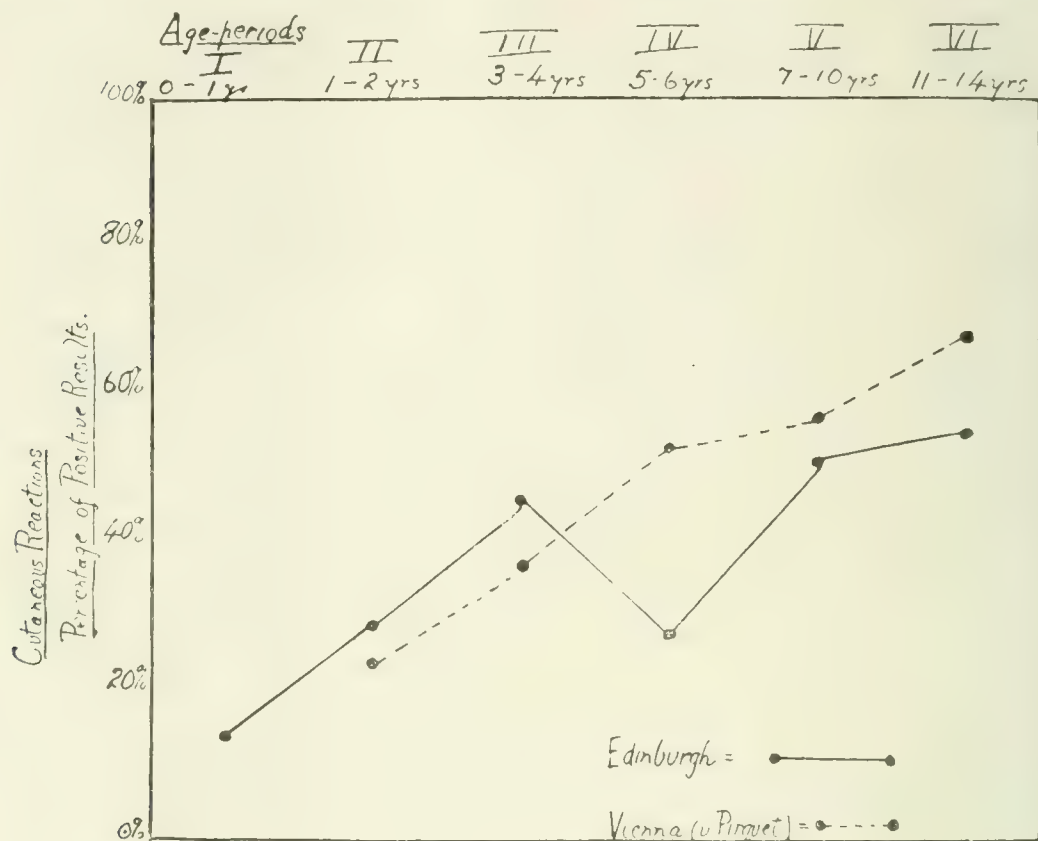
As has already been explained, this must point to some previous infection, and in view of the results of Group A, most probably to an infection early in childhood. The higher percentage shown seems naturally explained by the lower social class to which the members of Group B belong. It has to be remembered also that this group indicates latent tuberculosis alone, and that it should be regarded as a healthy population from which the cases of active tuberculosis have been removed by death, etc.

Statistical analyses of cutaneous reactions in children according to these age-periods have already been compiled elsewhere, and it will be useful to set several of these down in a table beside the figures for Edinburgh—Group A, just given.⁶

Age-Period.	EDINBURGH.			VIENNA.		PRAGUE.
	Group A.	Group B.	V. Pirquet.	Hamburger.		Ganghofner.
				I.	II.	
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
I. Under 1 year	14.1	...	...	...	...	8.5
II. 1-2 years	29.9	...	24	9	9	12.0
III. 3-4 years	46.6	...	37	23	27	27.0
IV. 5-6 years	28.8	...	53	36	51	47.0
V. 7-10 years	51.9	...	57	47	71	57.0
VI. 11-14 years	55.0	60.5	68	51	94	70.0
Total No. of Cases	371	170	988	509	509	

Some preliminary remarks must be made regarding this table. V. Pirquet's cases included diseases clinically tuberculous, and his

statistics are therefore comparable with those of Edinburgh. Hamburger's and Gaughofner's statistics were compiled from cases that were clinically non-tuberculous, though suffering from some disease. It seems hazardous to compare them with the Edinburgh figures, either with Group A of sick children, including cases of apparent tuberculosis, or with Group B of healthy boys. Under



Hamburger a double column is given—the first giving the results of the cutaneous test alone, the second, of the skin reaction combined with the subcutaneous injection of tuberculin, by which his percentages in the second column are greatly raised. Further comment will be made upon this combined test later.

These different columns agree in one point—in the high percentage of tuberculosis that is present in the later years of childhood, varying from about 50 per cent. in Edinburgh to about 70 per cent. in Vienna and Prague (excluding in the meantime Hamburger, Column II.).

But the way in which this maximum is reached is rather different in Edinburgh and in the continental towns given, and this difference may have some significance. In Edinburgh the maximum is much more rapidly attained. Looking at the figures

for Group A and those of v. Pirquet, which are strictly comparable, in the first three age-periods the Edinburgh percentages exceed those of Vienna. This point is illustrated in the graphic chart of these two sets of figures. The same thing is seen in a more marked way in the figures of Hamburger and Ganghofner. These last, however, exclude cases of clinical tuberculosis, but in the first two years of life, that is in Age-Periods I. and II. of the table, clinical tuberculosis very frequently assumes those intense and disseminated types in which the cutaneous reaction fails, so that at this point the error in comparison is reduced, and so it may fairly be said that the Edinburgh statistics diverge from all three sets of continental statistics in the heavier incidence of tuberculous infection in infancy and in the attainment of a maximum at an earlier period in childhood, namely during the fourth and fifth years. After this period in Edinburgh, so far as the present series shows, the increase is trifling, but in Vienna and Prague the increase in each subsequent period is substantial.

One would attach little importance to this divergence of sets of statistics, which in the case of Edinburgh are not numerous, were there not other facts which seem to suggest that it may have significance in connection with the incidence of tuberculosis in Scottish children and with the source of that infection. These facts are shown by three sets of figures.

The following figures give the mean annual mortality from tuberculosis per 10,000 of the population at all ages for Austria and Scotland in 1906⁹ :—

Austria 36.25.

Scotland 12.53.

These mortality figures include, of course, all forms of tuberculosis, and they show for Austria a death-rate thrice as high as here.

The second set of figures are prepared from post-mortem data in Vienna,⁷ and show the seat of disease in 175 tuberculous children. In 169 (97 per cent.) there was tuberculous disease of the bronchial glands, in 85 cases it was limited to these, while in 56 cases it was combined with tuberculous mesenteric glands, and in 49 with tuberculous glands in the neck. In no case was there a gland infection limited to the abdomen.

For Edinburgh no post-mortem statistics of this kind are available, but the following table prepared by Thomson and Fordyce is a clinical one and gives the percentage of cases of abdominal tuberculosis in various British and foreign hospitals¹⁰ :—

Place.	No. of Children.	Percentage of Abdominal Tuberculosis.
Edinburgh . . .	15,320	3·6 per cent.
Glasgow . . .	8,619	4·6 „
London . . .	22,896	1·8 „
Birmingham . . .	9,486	1·5 „
Aberdeen . . .	5,379	1·2 „
Vienna . . .	11,184	0·46 „
Munich . . .	1,886	0·42 „
Philadelphia . . .	18,016	0·14 „
New York . . .	3,082	0·42 „
Boston . . .	16,031	0·40 „

This table speaks for itself. Abdominal tuberculosis as a clinical condition is a much commoner condition in British children than in those of certain other countries, and in Britain it reaches a clear pre-eminence in our two first Scottish towns.

Gathering these facts together, we have in Vienna a very high mortality rate from “all” tuberculosis, a low incidence of abdominal tuberculosis, and a progressive increase in tuberculous infection in children *qua* the cutaneous tuberculin test, which only reaches its maximum late in childhood; while in Edinburgh we have a much lower rate from “all” tuberculosis, a very heavy incidence of abdominal tuberculosis, and as regards the cutaneous reaction a curve of tuberculous infection which is more marked in infancy, which practically reaches its maximum at an early period in childhood, and which thereafter shows only a trifling increase.

Certain deductions may be drawn from these facts. The low death-rate from adult tuberculosis in Edinburgh (which may be taken as pulmonary tuberculosis) means that the sources of human infection are smaller as compared with other places. The very great prevalence of abdominal tuberculosis here cannot therefore be attributed to this form of infection; it must be caused largely by bovine infection, that is to say, by tuberculous milk.

And if the figures for the cutaneous reactions in the Edinburgh children should be confirmed by larger statistics, the conclusion would be justified that this bovine infection is effected early in child life. While, therefore, preventive measures in Scotland, and especially in Edinburgh, have been increasingly successful in dealing with adult or pulmonary tuberculosis, it is very clear that our poor child population is still being poisoned in a wholesale way by tuberculous milk. Our machinery for dealing with human infection is acknowledged to be singularly complete and efficient, and its efficiency is expressed in the low and falling death-rate

for pulmonary tuberculosis in the city, but our arrangements for controlling and preventing bovine infection are extremely ineffective, and are reflected both in the high clinical statistics of tuberculous disease among children and in these figures of cutaneous reactions. But this question of tubercle-infected milk touches the whole problem of tuberculosis both in the child and in the man. In the last few years a new view of the pathogenesis of human tuberculosis has been forming. No one has enunciated it more clearly or brought more evidence in support of it than Hamburger.⁸ His view briefly is that tuberculosis is a disease which is sown in childhood, which remains hidden but growing during adolescence, and which comes to full maturity in manhood as pulmonary phthisis. The only radical cure is therefore that which will prevent infection in the child. That infection in Edinburgh, with its peculiar extremes of low adult and high child tuberculosis, must be largely of bovine origin. If, therefore, this source of infection could be cut off by the provision of a pure milk-supply, one might hope for a great reduction in tuberculosis at all ages, especially in children, but also in adults.

A very brief comment may be made on Column II. of Hamburger's statistics.¹¹ Where the cutaneous reaction failed he injected subcutaneously after 2 days 0·1 to 1 mgrs. tuberculin, and if this "Stichreaktion" were positive (a red swelling lasting 3 days) he considered this a case of latent tuberculosis which had either been activated by the previous absorption of tuberculin from the skin, or had been discovered by the more delicate subcutaneous test. It was only in the later age-periods that he appreciably raised his percentages by this procedure, but in the last period (11-14 years) he almost doubled the figure obtained by the cutaneous reaction alone—51 per cent. to 94 per cent.

The Value of the Cutaneous Tuberculin Reaction as a Clinical Test of Tuberculosis.—In the series of 371 cases (Group B) there were 74 cases in which the diagnosis was of some tuberculous condition. The result of the cutaneous test in those cases will be best shown in tabular form:—

	Positive.	Negative.
Abdominal tuberculosis . . .	22	7
Tuberculous meningitis . . .	10	4
Pulmonary tuberculosis . . .	7	5
Pleural effusion (serous) . . .	9	1
Tuberculosis elsewhere (skin, bones, joints)	9	0

Very little new is shown by these figures. It has been abundantly proved before that the test frequently fails in advanced tuberculous disease, and, indeed, after a considerable experience I have received the impression that the intensity of the reaction corresponds roughly with the general vigour of the child. The greatest number of these failures were in the cases of pulmonary tuberculosis where there was marked prostration and weakness.

With regard to tuberculous meningitis, the proportion of positive reactions is surprisingly high, for this is one of the forms of acute tuberculosis in which the test is generally said to fail. But if the concentrated old tuberculin is used, and properly applied, and especially if the case is tested early before general intoxication is extreme, the reaction is given in the great majority of cases. The papule is usually definite, though the colour is often pale, and this pale infiltration is of an unusually fleeting character. But the fact that the reaction does occur in tuberculous meningitis (contrary to accepted opinion) makes the test of value in the diagnosis of this condition, and especially in the early stages of the disease when its clinical diagnosis by other means is difficult. A positive reaction here would be strongly corroborative, though a negative reaction would not exclude the diagnosis.

The group of simple serous pleural effusion has been included among tuberculous conditions, because they nearly always give a positive reaction. In adults such a condition is now generally accepted as a tuberculous one, and in children the condition must receive the same interpretation. In a former series of fifteen of these cases which I tested fourteen gave a positive reaction.²

Of the total number of 140 positive reactions, more than half—83—were given by cases that were clinically non-tuberculous. These reactions appeared in every variety of disease and at all ages. In certain conditions they were more frequent. Thus they were present in 5 cases of subacute bronchitis, in 10 cases of chronic pulmonary consolidation, in 4 cases of empyema, and in 8 cases of chorea.

But the appearance of the reaction in a considerable number of cases where there is no clinical manifestation of tuberculosis greatly weakens the value of the test as a clinical test. That it is an unerring and delicate indicator of tuberculosis there can be no doubt; but it has no power to localise the seat of tuberculous mischief. Where tuberculous disease is manifest it is needless,

where it is latent the presence of the reaction may not have, and often has not, the slightest clinical significance. In the group of doubtful cases, as in chronic peritonitis or in chronic pneumonia or bronchitis, where it is important to exclude or recognise a tuberculous process, the occurrence of a positive reaction unfortunately does not remove doubt one way or the other; while again a negative reaction leaves the matter equally undecided, the failure to react being possibly due to the weak state of the child. In these doubtful cases decision must rest on the summing-up of the ordinary clinical evidence.

But outside clinical diagnosis the cutaneous test (the most convenient representative of a group of local tuberculin tests) is of great value in medicine. Its use in the adult population, not in special groups of diseases or in isolated cases, but on a large scale and in all conditions, will reveal the extent of tuberculous infection without, however, indicating the date at which it occurred. But its use in children at all ages and in all conditions, and on a larger scale than in the present investigation, will give more exact and more valuable information. It may or may not confirm the results of the present series, which show that latent tuberculous infection is a very common event in our poor children, and indicate that the greatest part of it occurs in the first five years of life.

The Cutaneous Reaction to Bovine and Other Forms of Tuberculin.—In 330 cases tuberculin prepared from bovine tubercle bacilli in exactly the same way as human tuberculin, was tested against a sample of the latter. In each case the concentrated tuberculin was always used. In the accompanying table H. means human tuberculin and B. bovine:—

H. and B. both positive and equal	55
H. and B. both negative	203
H. positive. B. negative	11
H. negative. B. positive	0
H. and B. both positive, but H. greater than B.	52
H. and B. both positive, but H. less than B.	9

It will be seen that in the great majority of cases the tests correspond, being equally positive or both negative in 258 cases. While the reaction to bovine tuberculin was absent in 11 cases in which it was present with the human preparation, there was not a single case of reaction with bovine and absence of reaction with human tuberculin. In a considerable number of cases (52) the

reaction to human tuberculin was greater than to the bovine, and in a much smaller number (9) was the reverse the case.

The results of this test defeated any hopes of discriminating by this means between a tuberculosis of human, and one of bovine origin. They simply show that in a large series of 127 cases of tuberculosis, active or latent, the reaction was equally intense to either form of tuberculin in almost half; that in about the same number the reaction of the human form was greater; and that in a very few (9) the reaction of the bovine form was greater. In the final report of the British Royal Commission on Human and Animal Tuberculosis strains of tubercle bacilli were isolated from 108 cases of disease in man. Of these 55 adolescents and adults gave 50 human and 5 bovine strains, while 53 children gave 34 human, 14 bovine, and 5 mixed strains. If one applies this proportion to my 127 cases of tuberculosis in children, a total of about 30 cases of bovine tuberculosis is given. But in the reaction of the children to human and bovine tuberculin absolutely no indication of one form of infection as against another is given. The only deduction from my observations is that over a considerable number of cases there is a greater reaction to human tuberculin in rather more than half. It is clear that if the proportion of human and bovine strains from cases of tuberculosis in children, as obtained by the Royal Commission, be applied to this number (63), they must have included about 15 cases of bovine tuberculosis; and yet these hypothetical bovine cases reacted cutaneously more vigorously to the human form of tuberculin.

A few tests were also tried with other forms of tuberculin—with T.R. in 4 cases and with B.E. in 5 cases. In all the cases were tuberculous and reacted positively to human tuberculin, which was used as a control; while in every case of the other form of tuberculin the result was negative. This is of importance in connection with the therapeutic use of tuberculin preparations, and will be discussed later. The absence of reaction with T.R. is illustrated in Fig. 3.

Enlargement of the Supraclavicular Glands and Tuberculous Infection.—Philip has suggested that the presence of "at least a dozen" small enlarged glands in the supraclavicular triangle may be taken as evidence of a tuberculous infiltration, and is often associated with a tuberculous invasion of the pulmonary apices, these glands being the common path of infection to the lung.¹² This sign would, if verified, form an easy and valuable test of tuberculous infection in children.

Some observations on this point were therefore made. The number of palpable enlarged glands on each side was roughly counted in 314 cases. These cases were divided into groups showing 12 and over on each side, groups of 6-12, groups of under 6, and those with no palpable glands. The results were as follows:—

Group.	No. of Cases.	Percentage.
12 and over	60	19·1 per cent.
6-12	101	32·2 "
0-6	132	42·0 "
0	21	6·7 "

It will be seen how common a condition is this small glandular enlargement at the root of the neck in children, occurring as it does to a more or less degree in over 90 per cent. of all ages up to 12 years. The same point was determined in the 170 cases of Group B (lads mostly from 10-15 years of age), and here the percentage was similar—about 95 per cent.

In the 60 cases where the number of enlarged glands on each side above the clavicle was 12 or over, the v. Pirquet reaction was present in 22 cases, or in 36·6 per cent., and negative in 63·4 per cent. In this large proportion of negative results the glandular infiltration must either be non-tuberculous or, if tuberculous, not of sufficient extent to yield a cutaneous reaction.

Further, these 60 cases occurred at all ages; but of the 58 children under one year examined for this point, 16, or 26 per cent., showed this multiple glandular enlargement. It is difficult to imagine that in this large proportion such a lymphatic hypertrophy expresses a tuberculous invasion, and indeed of this number only two reacted to tuberculin.

With this evidence the presence of enlarged supraclavicular glands as defined cannot be accepted as a clinical stigma of tuberculous invasion, so far as that invasion can be detected by the cutaneous tuberculin reaction.

The Cutaneous Reaction as a Guide to the Therapeutic Application of Tuberculin.—In the therapeutic use of tuberculin a great want hitherto has been some accurate means of determining the dosage and the dose intervals. Wright's opsonic index is not clinically practicable, and it seems also doubtful whether it is accurate in tuberculous infections. White and Graham¹³ have suggested an ingenious method by which the cutaneous reaction

is made to serve as a therapeutic index. It had already been established by v. Pirquet and Schick¹⁴ that in the hypodermic injection of "old" tuberculin the general febrile reaction was accompanied by a local inflammatory reaction at the tuberculous focus, and that the cutaneous or subcutaneous reaction in its intensity indicated a corresponding responsiveness on the part of this internal tuberculous focus to tuberculin introduced into the circulation. White and Graham gave exactness to this important general statement. By using various dilutions of "old" tuberculin (T.A.) they estimated for any case the minimal dilution that would produce a cutaneous reaction, using in each dilution an equal quantity—0.01 c.c. Further, they found that $\frac{1}{15}$ of this minimal dose for cutaneous reaction, given subcutaneously, still produced both a local and general reaction; that $\frac{1}{30}$ produced a local but no general reaction; and $\frac{1}{50}$ produced neither local nor general reaction.

The next point was to ascertain the optimum degree of reaction at the focus to be aimed at. Philip¹⁵ advocates the use of tuberculin in doses that will produce moderate reaction and so promote cicatrization of the focus. Other authorities advise such doses as will produce neither local, focal, nor constitutional reactions. White and Graham, in their own cases, used smaller doses in febrile cases, but in chronic afebrile cases gave doses that aimed at a mild reaction, and in their short series obtained results that were encouraging. It requires further experience to test this method, but its introduction has served to greatly clarify the principle of tuberculin therapeutics.

Tuberculin, used as "old" tuberculin (T.A.), has effects upon the tuberculous process that are now more clearly understood. It produces hyperemia and exudation round about the tuberculous focus, which in some cases at least are followed by a process of cicatrization. That, indeed, is the natural process of cure of the disease in the body, and this natural process is excited by auto-inoculations of tuberculin from the focus of disease. Where this natural cure is proceeding satisfactorily, such doses of tuberculin are released from the focus as will effect a local reaction—hyperemia, exudation, cicatrization—but will not produce a severe general reaction—fever, wasting, etc.

If we wish to imitate this ideal natural process it can only be done by a most accurate adjustment of dosage which will secure the maximum of local and the minimum of general reaction. The method of White and Graham is perfectly sound upon theoretical

grounds, and seeks, by means of the cutaneous reaction, which is a superficial indication of the tuberculin responsiveness of the body, to copy and induce the method of healing adopted by Nature herself.

From this point of view it will be seen that in febrile cases of tuberculosis the optimum dosage of tuberculin—here an auto-inoculation—has already been exceeded, and to add to this surplus by an artificial inoculation does not seem rational therapeutics. But afebrile cases, where local healing has become sluggish, seem to offer an excellent opportunity for stimulating this process of cicatrisation by carefully adjusted doses of tuberculin.

In the foregoing paragraphs tuberculin as T.A. has been used to indicate the extra-cellular poisons of tubercle bacilli. These poisons are found in such preparations as “old” tuberculin, tuberculin-original-alt (T.O.A.), and Denys’ tuberculin, and it is these which produce the specific tuberculin reactions, local (skin, eye), focal, and general.

But the tubercle bacilli produce other toxic bodies, which seem for the most part to be retained in the bacterial protoplasm as endotoxins. Examples of preparations of these are “new” tuberculin (T.R.) and tubercle bacilli emulsion (B.E.). These preparations do not produce local reactions, as has been shown (p. 336); and though when injected subcutaneously they may produce fever and focal reaction, these results are almost certainly due to extra-cellular toxin which has been retained in the bacterial protoplasm. The therapeutic use of these substances—T.R. and B.E.—therefore involves a process of healing which is not that of cicatrisation and sealing of the focus; it may be concerned with the production of opsonic or bactericidal substances. For its control, the method of White and Graham is of course not available. But it seems worth while to emphasise this distinction between the two groups of toxins produced by tubercle bacilli. In their pathological effects they differ. The pathological effects of the extra-cellular toxin are in part at least known; locally they produce hyperemia, and constitutionally they produce fever and wasting; and if properly adjusted the result may be cicatrisation and healing. As to the endotoxins, nothing is known as to their pathological effects.

Where, therefore, we use in tuberculosis such a substance as “old” tuberculin or any other bacillary filtrate, we are handling a weapon of whose properties we know something, and whose effects we can control to a certain extent by the cutaneous

reaction; but when we use such preparations as T.R. or any other form of bacillary emulsion, we know almost nothing of the weapon we are using, and we are not agreed as to any method by which its effects can be judged.

One final point may be discussed. Raw¹⁶ has advocated the use of bovine tuberculin in cases of pulmonary tuberculosis. His grounds for doing so are that while tuberculosis in the child, as abdominal, joint, or bone disease, is generally of bovine origin, that in the adult, as pulmonary disease, is generally caused by the human strain of bacillus; secondly, that one strain of bacillus or its products produces an antagonism in the body of a patient who has been invaded by the other strain. For these reasons he advises the use of bovine tuberculin in cases of adult pulmonary tuberculosis. But the results on p. 335 show that the local reactions produced by human and bovine preparations of tuberculin are equal in about one-half of the cases tested, while in the other half the reaction to the human tuberculin is slightly greater. What is true of the local applies also to the focal reaction, on which the therapeutic benefit depends. So far, therefore, as the effects of tuberculin are known, the human form is no less potent than the bovine, perhaps slightly more so, in producing a reaction in the body of man whether he suffers from a bovine or human strain of bacillus. Raw speaks of excellent results from the practical application of the theory he has formed, but it seems probable that he would have obtained the same benefit had he used the other and equally efficacious preparation of tuberculin.

I wish in conclusion gratefully to acknowledge the kindness of Dr. Melville Dunlop, Dr. John Thomson, and Dr. J. S. Fowler, who gave me every facility to carry out the investigation in their wards; and also to express my obligations to the Carnegie Trustees for a grant which has defrayed the expenses of the investigation.

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Med. Research, 1909, p. 255. ¹⁴ V. Pirquet, *Archiv. Pediatr.*, 1910, vol. xxvii. p. 161. ¹⁵ R. W. Philip, *Brit. Journ. of Tuberculosis*, 1909, p. 263. ¹⁶ Raw, *Lancet*, 1911, vol. i. p. 927.

EXPLANATION OF FIGURES.

FIGS. 1 and 2.—Upper reactions with undiluted "old" tuberculin; middle with 25 per cent. tuberculin; the lower marks are the controls. (1) Shows diminished, (2) absent reaction with the diluted preparation. Both from cases of abdominal tuberculosis.
FIG. 3.—Upper reaction from undiluted "old" tuberculin; middle mark showing no reaction from the use of "new" tuberculin (T.R.); lower mark is the control—from a case of abdominal tuberculosis.

ON TYLOSIS PALMARIS ET PLANTARIS, WITH REPORT OF THREE CASES.

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As an example of this somewhat rare condition of hyperkeratosis the following cases seem worthy of record :—

Three children, a boy, æt. $11\frac{7}{12}$; a girl, æt. $7\frac{5}{12}$; and a boy, æt. $5\frac{11}{12}$, from the island of Fetlar, Shetland, were admitted to the Royal Hospital for Sick Children, Edinburgh, complaining of “warts on hands and feet.”

Family History.—Parents healthy; distantly related; marked history of phthisis on both sides, and of epilepsy with insanity in father’s family.

The patients are 1st, 4th, and 5th respectively in a family of 8 children, all boys except the girl noted here. The others are perfectly healthy, except for severe rickety bone deformities (rare in Shetland). They have always lived under very primitive and dirty conditions. It is certain that there are no similar cases amongst the inhabitants of the island (pop. 347), and that there has not been a case for many years.

History (applicable to all).—Healthy in every respect till about 3 years of age. Teething, speaking, and walking “rather late.” About this time “little warts” were noticed, beginning to appear on palms and soles alone; these gradually became worse, and after some months had run together to form regular plates; since then the condition has remained practically unchanged. The skin elsewhere has always been healthy, and there is no general complaint whatever. At times (no definite season) the “tops” used to peel off, leaving a tenderness which necessitated carrying the children about at these times. The thick part soon grew again, and there was never any bleeding, discharge, or definite itchiness.

State on Admission.—All are well nourished. The mentality of the two youngest is defective.

The hands are poorly formed—short and broad—the distal phalanges being specially short, thick, and clubbed. The nails are small and their natural curves exaggerated, otherwise the nail and nail-bed seem healthy.

The arches of the feet are practically lost; it is difficult to say if there is any abnormality of the toes or nails.



FIG. 1.



FIG. 2.

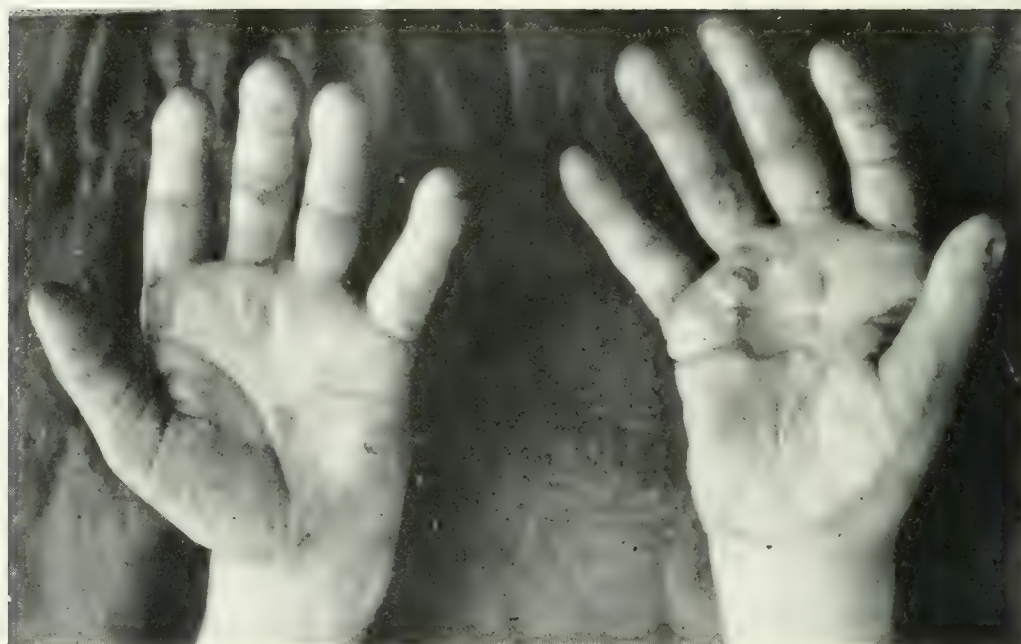


FIG. 3.

DR. LEWIS THATCHER'S CASE OF TYLOSIS PALMARIS ET PLANTARIS.

They walk gingerly, hold their hands in semi-accoucheur position—slightly flexed at wrist—and the movements at the various joints are curtailed.

Local Condition.—The lesions are most marked in the youngest and least so in the eldest child.

Over the palmar and plantar surfaces, most intense on the latter, strictly limited to these regions, and quite symmetrical, there is a horny thickening of the epidermis, in parts forming flattened yellowish plaques intersected by many cracks and fissures, some complete, of a brownish colour and producing a mosaic-like appearance, in other parts merely resembling the thickening often seen on a mechanic's hands. The distribution on the soles is seen in the photographs (Figs. 1 and 2). On the hands the thenar and hypothenar eminences and the two distal phalanges are most affected, no part being quite free, except as noted below. There is a sharp line of demarcation at the wrist folds (Fig. 3).

The condition is completely absent at the normal flexures and areas of no pressure; here the skin is perfectly supple. In places the masses are becoming detached, leaving a tender area with enlarged papillæ but no bleeding or other discharge. The feet especially show hyperidrosis. There is no change whatever in the surrounding parts, and the margins are well defined.

The eldest child has a normal scar on the dorsum of one hand and also ordinary corns on each little toe. The youngest has a spot of thickening, resembling a wart, on the knuckle of the left ring finger and also on the right little finger.

The skin elsewhere is perfectly healthy. Hair, teeth, and gums normal. No enlarged glands. Von Pirquet's cuti-reaction negative.

After some months' observation the children were sent home all marked thickening had then disappeared, and there was only distinct roughness left; they could get about with comparative freedom.

Treatment.—The best results were got by complete rest, starch poultices, soaking in a strong solution of carbonate of soda, scraping off as much of the softened *débris* as possible and then applying 3 per cent. salicylic acid plaster. At times the following ointment was used instead:—

R	Ac. salicyl.	gr. xxx.
	Ichthyol	ʒi.
	Ol. olivæ	℥xxx.
	Lanolin	ʒi.

Three years having elapsed, the following report has been received:—"There was no permanent improvement whatever in their condition—soon becoming just as bad as when first sent to hospital and remaining so to date."

Remarks.—*Heredity* is always a prominent feature in this condition. It shows itself (*a*) as handed down from parent to offspring; (*b*) in the occurrence of family prevalence. These naturally often occur together.

Here 3 children out of a family of 8 were affected, there being no similar condition amongst relations as far as known. Thost¹ reported 17 cases in 4 generations; 8 of these he saw himself, and 6 was the largest number in one family. Allan Jamieson² reported 14 in 5 generations, and probably they extended even further back. Jacob and Fulton³ noted 24 cases in 5 generations, of which 7 were seen belonging to 3 generations. The family legend as to the origin of the affliction here was interesting. The grandmother, while pregnant, was startled by seeing a large fish leap out of the sea; soon after she gave birth to a child with "fish-scales" on hands and feet, and 11 other children following in due course were similarly affected.

The condition is *transmitted through* and *affects both sexes indiscriminately*, and *skipping of a generation* may occur. In most cases, as here, the disease is *only noticed when the child begins to use the hands and feet* for purposes of perambulation. In all Thost's cases, however, it was said to be present about the 1st week of life as a slight roughness of the parts. Unna⁴ noted a case where at birth palms and soles were surrounded by a bluish border, from which, when 7 months old, horny growths began to appear. Graham Little⁵ noted a case with the condition present from birth, and gradually progressive from that time. The youngest child seen by Jacob and Fulton was aged 1½, and her palms and soles were considerably thickened, white and rough, like ground glass.

These examples show that although the condition is sometimes congenital in the ordinary sense of the word, in most cases intermittent pressure after birth is required to develop it fully. As Ballantyne⁶ says, if the parts were carefully examined at birth some slight abnormality would probably be noticed at that time.

These cases were perfectly typical in most respects; I only wish to bring out the following additional points:—

1. *Bad Family History.*—Parents were related; marked history of tubercle and epilepsy with insanity; simple primary amentia in the two youngest patients.

Bassager⁷ reported the case of a man, his three brothers, and his father having tylosis, whereas his only sister escaped the skin lesion, but died insane.

2. *Poor Formation of Hands, with Characteristic Clubbing.*—This would apparently only signify disordered circulation from any cause. Gaucher and Milian⁸ report a case showing, together with the hyperkeratosis, the following conditions:—Great laxity of the muscles and ligaments, with a typical “*main en griffe*” condition; great thickening and other deformity of the nails; multiple cysts, probably sebaceous. In addition, there was marked exaggeration of all the deep reflexes, with general hyperæsthesia—signifying undue excitability of the nervous system.

3. *Absolute Limitation to Bearing Surfaces.*—The natural flexures and other areas not subject to pressure were absolutely unaffected. It is interesting to note that one of the children had ordinary corns on each little toe, and also a healthy scar on the dorsum of one hand. This involvement of palms and soles alone is the usual rule. Occasionally, however, thickening is found elsewhere, *e.g.* about the dorsal surfaces of the digits, the knees, and outer aspects of elbows,⁵ associated with a mild ichthyosis,¹⁰ or with keratosis pilaris of arms and legs. My youngest case alone had little spots of thickened skin on two knuckles.

Stelwagon¹¹ notes that tylosis, or an analogous condition, is endemic on the island of Meleda, off the coast of Dalmatia; here, however, the patellar regions, with the lower leg and forearm, also showed some thickening.

Thickening of the matrix, with consequent tilting of the nails, has occasionally been seen, and the nails themselves have been described as ragged or unduly curved.

Besnier¹² divides the cases of hyperkeratosis into 4 groups—

(a) Ordinary typical symmetrical and hereditary form.

(b) Symmetrical keratoderma developing in childhood, of an erythematous and irritable character, and probably connected with some neurosis.

(c) Symmetrical keratoderma, especially of feet, developing primarily in isolated foci, and probably of central origin. (This probably includes the arsenical variety, which has been described as beginning around the orifices of the sweat glands, and to be specially associated with hyperidrosis.¹⁵)

(d) Accidental keratoderma, as provoked by occupation.

Of these only (a) is touched upon here.

Pathology.—Sections merely seem to show a great increase in

thickness of the horny layer, in the numbers of prickle-cells—with consequent thickening of the rete Malpighii—and fivefold increase in the length of the papillæ.

The condition has been regarded — 1. As belonging to the group of acanthoses, being looked upon as a variety of cornu cutaneum.

2. As a localised form of ichthyosis. Ballantyne⁶ regards it as allied to fetal ichthyosis but differing from it, in that in this condition the epidermic thickening is developed to its full extent *in utero*, whereas in tylosis it develops progressively after birth. Family prevalence is marked in both conditions. Ordinary ichthyosis rarely appears till towards the end of the first year, and seldom affects palms or soles.

3. As a form of nævus, of embryonic origin, and probably allied to ichthyosis hystrix.

4. As a reversion to the type of our arboreal ancestors.

5. As of primary central origin.

6. As of peripheral (local) origin.

The pathogenesis is therefore very obscure.

That the bearing surfaces are unable to withstand ordinary pressure and friction is evident: hereby the normal balance of formation and shedding-off of the horny skin is upset.

Whether this defect is (1) *local*, depending possibly on some malformation of the touch corpuscles, which are notably abundant in these areas, and therefore reflex in origin; or (2) *central*, and therefore depending on some disordered trophic influence, has not yet been decided.

I am much indebted to Dr. John Thomson for allowing me to publish these cases.

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PIPETTE FOR THE COLLECTION OF DISCHARGES
FOR BACTERIOLOGICAL EXAMINATION.

By IAN STRUTHERS STEWART, M.D.

WHEN taking material for bacteriological examination, especially when swabs are used, a great difficulty is to avoid contamination by extraneous organisms. This is specially noticeable when taking specimens of pus from septic cavities. Here the pipette may be introduced through a sterile speculum and the discharge obtained from the seat of infection. When the material is taken with a view to vaccine preparation, contamination by extraneous organisms makes the task of finding the causal organism more difficult and necessitates subcultures. The use of subcultures is to be avoided as far as possible, and with that end in view the writer designed the pipette here described.

A piece of soft glass tubing $\frac{3}{8}$ ths of an inch in diameter is taken and held in the flame of a blowpipe. A portion of about $1\frac{1}{2}$ ins. is heated to a white heat and then drawn out, first at one end and then at the other, so that it forms two small tubes of about $\frac{1}{8}$ th in. in diameter with a bulb the full size of the original tube in the middle. One end is sealed in the flame at about one inch and the other at about five inches from the bulb. As the whole of the glass tube forming the pipette has been heated to a white heat and closed while in that condition, there is no need for further sterilisation. About $\frac{1}{4}$ of an inch from either end of the fine tube a scratch is made with a diamond. This is to make it break with a clean-cut edge. The diagram (Fig. 1) shows clearly the appearance of the pipette when sent out ready for use.

To employ the pipette both ends are broken through at the scratches and the rubber teat placed over the short end till it fits tightly over the bulb. The other end



FIG. 1.



FIG. 2.

should be sterilised by passing it through the flame of a spirit lamp. The teat is compressed, the free end of the pipette is introduced into the discharge to be collected, and by relieving the pressure on the teat the pus is made to enter the bulb. When the bulb is half full the pipette is withdrawn and the long limb allowed to empty itself into the bulb. This long limb is now sealed in the flame about one inch from the bulb, the teat removed, and the other end sealed (Fig. 2).

The bulb with the contained pus can now be packed up and sent by post.

The most important point is not to scorch the pus when sealing the bulb. This is easily avoided by getting the discharge well up into the bulb before sealing the ends of the pipette.

MEETINGS OF SOCIETIES.

Edinburgh Medico-Chirurgical Society.

DISCUSSION ON THE TREATMENT OF SIMPLE FRACTURES.

A MEETING was held on 28th February 1912, Mr. J. M. Cotterill, President, in the chair.

Mr. Charles W. Cathcart opened the discussion. His paper will be found at p. 303.

Professor Alexis Thomson said that personally he was a disciple of the French surgeon, Lucas Championnière. It was difficult to formulate any parallel regarding the enormous improvement which Championnière's work had brought about on the results of the treatment of fractures. Professor Thomson had been fortunate in succeeding Professor Chiene, from whose wards splints in the treatment of fractures had disappeared for some years previously, and in being associated with Mr. Pirie Watson, who had taken a special interest in the treatment of fractures. He confined his remarks to fractures of the lower extremities. The contrast between the treatment of fracture of the femur when he was a student and its treatment at the present time was marvellous. Then chloroform was administered, the fracture reduced, a short local splint applied, extension applied to the limb, and finally the long splint was applied and the patient lay in bed for from six to ten weeks while the fracture united; there was great discomfort to the patient lying in the long splint, and complete loss of function of all the tissues. Nowadays a patient with fracture of the femur may or may not be given chloroform for its reduction, and unless he has some shortening to be corrected by extension he has no other disability. The knee is flexed over a pillow and he is encouraged to use his muscles, with the result that while the fracture is uniting his tissues are kept in good condition. Three or four days after fracture of the shaft of the femur the patient should be encouraged to use his thigh muscles and promote absorption of the extravasated material. If a more difficult fracture has to be dealt with, in which there is pronounced shortening, perhaps beyond what is capable of being overcome by the ordinary extension with weight, he advised the use of an apparatus invented by Steinmann, a specimen of which was shown. It was placed on either side of the limb and fixed to a pin inserted into the lower end of the femur. By this means extension equal to 40 or 50 pounds was obtained, and any shortening could be undone; in fact one had to be careful not to make the leg longer than its fellow. The most difficult thing to correct is the eversion, and undoubtedly for this purpose the long splint was useful; sandbags on either side of the limb were also useful. Under modern methods eversion is most difficult to correct in fractures of the shaft and neck of the femur. In using Steinmann's apparatus in fracture of the neck of the femur one must be sure that the pin is introduced through the trochanter in such a way that it will ultimately arrive at the side of the bone. Sometimes two pins may be necessary.

While one of his patients was lying in bed with two pins through the trochanter she was encouraged to turn the limb in certain directions, and the masseuse kept the leg in better condition. It is more difficult below the lesser trochanter. If rest is combined with the splint apparatus and the limb

is allowed to lie over a pillow, massage will keep the condition of the limb right in other respects. On looking into the results of his cases this winter he found one fracture of the thigh up and walking about in six weeks ; by the older methods that result could not have been achieved. In fracture of the femur, with a sandbag lying on either side, if the patient is asked to lift the leg the bending can be seen as he lifts it. Some years ago it would have been considered criminal to lift the leg off the bed, whereas now we know it is beneficial. In another case an old woman over 80 was walking well in six weeks ; in the case of a man with fracture of the neck of the femur he was up on the 21st day and out on the 28th.

Mr. David Wallace was of opinion that the introduction of X-rays had given a great impetus to the consideration of fractures. Genito-urinary surgery entered on a new epoch when the cystoscope was introduced, and the treatment of fractures had entered on a new epoch when the X-rays were introduced. He thought it a duty in every case of fracture to use the X-rays, not only for the purpose of definitely determining where the displacement is, but even after the setting of the fracture had been carried out, in order to see whether that has been properly done. In the case of the upper extremity not infrequently the screen was sufficient.

Mr. Cathcart had alluded to three methods, and under certain conditions each of these has a merit of its own, and in individual fractures any one of them may be the proper one to adopt. He had been for many years a strong believer in Lucas Championnière's method, all the more so perhaps because, like Mr. Thomson, he was associated with Professor Chiene, who laid great stress upon its value, and it was interesting to remember that Professor Chiene in his teaching pointed out how important movement and massage were in a fracture near a joint, and how he recognised that union took place quite satisfactorily in spite of the movement and massage carried out. In Colles' fracture more particularly good results are obtained ; in Pott's fracture, however, they did not carry out that treatment until Championnière showed it was the right thing to do. Displacement is due to one of two things, namely, to the violence producing the fracture or to muscular action. On this depends greatly the treatment suitable for individual cases. In the former circumstance once the fracture is set there is no reason for any further displacement occurring ; this is so both in Colles' fracture and in Pott's fracture, and in these cases, as Mr. Cathcart has said, a splint or some form of support may be beneficial for a day or two after the accident to give comfort to the patient, but is not required to prevent displacement. Mr. Wallace used practically no splints in his wards. In Pott's fracture he kept the leg at rest, he never used sandbags ; in Colles' fracture he put the arm in a sling and encouraged the patient to make movements. In fracture of the femur it was most important to have good alignment of the bone ; as Arbuthnot Lane and Robert Jones pointed out, if the alignment is unsatisfactory then the weight of the body is borne in such a way that it gives rise to much pain. If good alignment cannot be obtained without operation then he thought operation was the right thing. During the past year he had had three cases of fracture of the femur ; two of them were transverse fractures about the middle third, and in neither could he get the fragments in apposition, he therefore cut down and plated them. These two cases were extremely satisfactory, while the third case was at present under treatment.

He asked what Mr. Cathcart's procedure was in fracture of the clavicle. Personally he thought it was more difficult here to get a good result without shortening than in any bone in the body; also he would like to know what his results are in operation for fracture at the elbow joint. He mentioned the matter because he (Mr. Wallace) had had two cases in which the results were not good. He operated on one of the cases twenty-four hours after the accident, but it was not satisfactory on account of a chronic rheumatic arthritic condition developing immediately after the operation. The wound healed by first intention. In the other case the condition was present at the time of the operation, and although half of the head of the radius which had been displaced was removed the arthritic condition persisted, and the elbow did not make a satisfactory recovery.

Mr. Scot Skirving referred to the method of reduction of Colles' fracture as practised by Robert Jones of Liverpool, and demonstrated the procedure. For fracture of the femur the calliper splint—a modification of Thomas' knee splint—was a great advance on the long splint and extension.

Personally he operated more frequently now than formerly, but never on any fracture in which there is no displacement. He agreed that in fracture of the femur where there is much displacement better results were obtained by operation than by the old method where one has been unable to get the ends in exact apposition. Mr. Skirving thought there was a great tendency to displacement in Pott's fracture. It has to be carefully watched; the great risk was the development of traumatic flat foot.

Mr. Wade said that during the past three years he had had exceptional experience in the treatment of simple fractures. In the Out-Patient Department of the Royal Infirmary treatment by massage and movement had been carried out for some time before that. He gave the following account of the procedure carried out and the results obtained:—A fracture arrives and is examined by the house-surgeon, some temporary treatment is employed, and the patient told to return the following day. When he returns a careful examination is made and a record of the case taken; an X-ray photograph is taken, which is ready the next day; the passive treatment is carried out, and the patient handed over to the massage department. They quite exceptionally used splints. The rule is for the massage to commence at once and for passive movements to be carried out from the first, and, even in the most severe cases, active treatment within the first week. By means of the X-rays they had discovered that in a large number of cases where there has been injury to the limb, fracture is present where formerly no fracture would have been suspected. So much so is this the case that in the ordinary individual who comes to a medical man twenty-four hours after the receipt of an injury, and who has a complete functional disability of the part with local tenderness over the bone, although there is no deformity and no crepitus, there is a fracture of the bone; he would estimate that in 99 cases out of 100 there is fracture of the bone. The best and most expeditious results were obtained by the massage and movement method; by this treatment 90 patients out of 100 recovered.

Mr. Cathcart referred to a selected group of cases in which he would employ operation, and mentioned the case where a muscular attachment is torn off. They had had 7 or 8 such cases in the Out-Patient Department, one where the olecranon process was separated fairly widely from the shaft of the bone. At

first they were doubtful about trying massage and movement. The method followed, however, was to set the part; the arm was kept in a sling and massage and movement adopted, the part being steadied and held down while the movements were practised. He doubted whether any other treatment gave such good results—within three weeks union took place. In a number of cases they had the massage done by the patient's wife; they had been able to instruct her in a very short time, and she was able to carry out the treatment quite satisfactorily.

Mr. Scott Carmichael said that during the last two years in the Out-Patient Department of the Infirmary they had seen 1200 to 1300 cases of fracture, more especially of the upper extremity. The basis of treatment was massage and movement. Splints in the treatment of fractures were occasionally necessary, and should be looked upon as a rare accessory. He agreed that this treatment was undoubtedly a great advance on the old method by splints but there were one or two disadvantages. He was convinced that it required a good deal more supervision and a great deal more care on the part of the surgeon and doctor. There were good masseurs and also bad ones, and striking differences in results were seen according to the intelligence and skill of the masseur or masseuse, and one must therefore be sure that the proper massage treatment was used, hence a great deal more supervision was required.

Mr. Scott Carmichael was convinced that if they were to treat fractures properly and satisfy both the public and the profession there should be a special department for fractures.

Mr. Dowden said he had come to the conclusion that the use of these various splints was wrong. In treating a case in private he employed adhesive plaster, placed the arm in a sling, encouraged the patient to make active, not passive, movements, and himself massaged the part. He had done away with splints and bandages, but there was still, unfortunately, shortening which had to be corrected by extension. In one case of fracture of the forearm the patient got perfectly well without splints being employed.

Dr. Langwill referred to the after-treatment of fractures. Most of the previous speakers had referred to the treatment of fractures while under the care of the surgeon, but he was more particularly interested from the compensation point of view. He was frequently sent to workmen who had met with an accident who had not been under his care, but under the care of one or other of the surgeons present. He did not see quite the satisfactory results afterwards that the speakers led one to expect. What he found was that after a certain time the patient is discharged from, or leaves, the hospital where he was being treated with the fracture supposed to be cured as regards the original injury, but he is unfit for work. The point of importance, to his mind, was not merely the union of the bone and a fair amount of movement in the limb, but the patient's ability to earn his livelihood; until then he ought to remain under the care of the surgeon who originally treated him. The difficulty was that these patients were often living in lodging-houses with nobody in attendance. They nurse their injured limb, going about with it in a sling, and one cannot get them to use it. When a medical man is sent to see the patient on behalf of the employer he finds the man going about; he is not under the care of any surgeon, it is nobody's interest to see that he is treated. The employers could not insist that their medical men should treat the patient. The patient's statement is that the hospital doctor said he need not come back as the fracture

had united. But the limb is not useful, and that man, he thought, ought to be still in attendance. Dr. Langwill could not help thinking it would be useful demonstration if surgeons at institutions got their old fracture patients to report themselves two, three, or four months after leaving hospital. They would find a great many of them going about unable for work and drawing compensation.

The important point was when a fracture case should pass out of the cognisance of the surgeon under whose care he was, whether merely after there is good union and the patient is able to walk about with the limb more or less useless or when he is cured, viz. fit for his original work.

Mr. George Chiene emphasised the advantages of active over passive movements in the treatment of recent fractures, and said to a certain extent he supported Dr. Langwill's contention, but on the other hand those patients whom he saw were looking out for compensation.

He showed two photographs in illustration of the value of wiring fracture of the patella in recent cases. In one case the patient, who died of Bright's disease, was the 7-foot clown in a travelling circus; the man was at work until shortly before he died. This patella shows four different breaks; the fragments showed that the fracture was an old one. The other photograph represented a fracture which occurred in a soldier 7 years previous to the time he came under Mr. Chiene's observation. He had been invalided from the army seven years before. That man had been doing all sorts of work, and the movement at the knee-joint was perfectly good.

Mr. Pirie Watson thought they owed a debt to the operative school for having stimulated an interest in fractures throughout the country. He confined his remarks to the special experience of fractures of the upper extremity which he had had in the Out-Patient Department of the Infirmary. The splint he did not consider important, what really was of consequence was massage and movement at the beginning. The treatment could be carried out with benefit in all fractures except that of the patella, and was applicable by either surgeons or general practitioners, and was specially desirable in older patients. There was great difference between the power of recovery in young and in old joints. The immobilisation method is merely concerned in keeping the bone in anatomical alignment, while the massage and movement method deals with the affection of the soft parts. He emphasised the point that the massage and movement treatment could not be started too early. The massage, at all events, might be started at once. It gives the patient comfort and confidence if rightly employed; it should precede reduction, and for overcoming spasm in the muscles it is useful. Again, massage and movement produce an excellent mental effect on the patient. This treatment was not easy to carry out, it required a great deal of attention, but if it takes more time at first it certainly saves time and vexation later. The masseur, too, is an important factor; he thought the best masseur was the doctor himself. He knows the danger of rough movement, and his training has given him the necessary fineness of touch required to produce good results in massage and movement. As to the criterion of massage, it should never pain but always sooth.

Mr. Watson had been able to get perfect alignment in fracture of the clavicle. In one of his cases of fracture of the olecranon the patient was only off work three weeks, and perfect bony union could be seen. He had

treated eleven cases of fracture of the humerus without any splints, and the patients were back to work. The last patient was discharged at the end of five weeks, and working as a painter at the end of six. Fracture into the elbow joint also gave good results by this method, but must be very carefully attended to.

Dr. John Orr said that as general practitioners they knew about Championnière's method before, but were not sure about putting it into practice. When he (Dr. Orr) was taught surgery the teaching was that the joint above and below should be controlled, and that the limb should be immobilised; but there were two exceptions—one was Colles' fracture and the other fracture of the elbow joint. In Colles' fracture early passive movement was carried out; in fracture of the elbow joint early passive movement was also used, and no splints applied. One would have expected that if the statements with regard to the immobilisation of the joints above and below were absolutely accurate that worse results would have been obtained with regard to movement. His experience was that worse results had not been obtained in Colles' fracture and fracture of the elbow joint.

Dr. James Ritchie said he spoke as a general practitioner, and was afraid he would be considered heterodox, because after a fracture has been reduced his practice was to apply a light splint with an elastic bandage because of the great comfort it gives to the patient. The patient's comfort was a point of great importance. The elastic pressure diminishes the amount of swelling afterwards. He was old enough to see the difference between the old method and the new, and was quite astonished at the difference in time required. It was astonishing how much sooner patients were sent home cured under the new treatment than under the old. Massage ought to be begun the very day of the accident; by so doing the blood and inflammatory material is removed much sooner. On the other hand the new treatment involved a tremendous increase of time and care on the part of the doctor. Patients should be encouraged to carry out all the movements they possibly could, and to do the same every day. His method was to endeavour to produce as much movement as possible in the proper direction until pain is produced; immediately pain is produced stop. Each day one is able to do a little more.

Mr. J. W. Struthers said Dr. Langwill had complained that the patients passed out of the surgeon's care before they were cured, and Mr. Struthers thanked him for introducing a controversial element into the discussion. It seemed to Mr. Struthers, however, that the employer was the proper person to treat the patient. After the patient reaches a certain stage the best thing he can do is to work; what he wants is voluntary movement, and the best compulsion which can be brought to bear on him is that of earning his living. The difficulty is that employers will not take these patients back to work. If it were possible to get light jobs for them they would be fit in a much shorter time than they are at present. Professor Alexis Thomson's remarks on the treatment of fracture of the femur had struck him, for he (Mr. Struthers) had great difficulty now and then in obtaining anything like a good result in that condition even in strong men. He had not used Steinmann's apparatus, but with the older methods of treatment he had to confess he had been unable, in a certain number of cases, to get reduction of the deformity without shortening and a good deal of disability. He would like to hear something of the operative results in these cases; probably better results were obtained than by means of "nails," extension, strapping, or wires attached to the femur.

The President said, as a member of the staff of the Infirmary, he would like to remind Dr. Langwill that there are two sides to the question he raised. They were all aware, and were ready to admit, that they had to send out not only fractures but a great many other cases from the wards before they would like, but what could be done when there were many urgent cases for operation waiting for the beds. When a patient with Pott's fracture was sent out they knew he was not fit for work, but they were invited to attend the Out-Patient Department, and he thought it would be a great advantage to have a larger staff of rubbers and others to look after these cases. They must be careful as to whether the fracture was recent or old, and not put these patients into the hands of a somewhat enthusiastic and very muscular masseur. He was conscious of cases which have been harmed instead of the contrary by a very enthusiastic masseur; they had to be watched with great care, and particularly so in the treatment of fractures.

The President was very much in agreement with Mr. Alexis Thomson when he made an uncomplimentary remark about the long splint. It seemed treason to abuse that method which was so intimately connected with the Edinburgh School, but the long splint, he agreed, was an abomination. It had been said that much more care was required in treating with massage and movement than with the splint; on the other hand one required to be constantly watching the long splint to prevent anything going wrong. The patient sinks down in the bed, and angulation and internal rotation of the foot result. He was sorry they had been so long in finding out its disadvantages, and personally he had entirely given it up.

Mr. Cathcart in reply thanked the Society for the kind response they had given to his paper. He had not tried Steinmann's apparatus, disliking the idea of putting nails into the femur, but if the results were always as good as Mr. Thomson has found them he would certainly consider adopting it. With regard to the bending method in fracture of the neck of the femur, that was not, he thought, necessary, but he did not know whether an intra-capsular or an impacted fracture was referred to. He still used splints, and he had seen a fair number of cases, such as Dr. Langwill referred to, in which there had been unsatisfactory results where no splints were employed. He could not help thinking that the bone after being replaced under an anæsthetic could hardly fail to come out of place if not supported for a week, ten days, or a fortnight by splints. In fracture of the humerus he still used splints and had not seen any harm result. Plaster and massage should perhaps replace the splint. In fracture of the clavicle he did not use splints—Sayres' method was better.

As regards Dr. Langwill's remarks, it was sometimes very difficult to get the muscles and joints back to their normal condition. It was not his experience that by the Lucas Championnière method of treatment when the bones have united the muscles have returned to their proper power, but, as the President said, they had to turn out their patients too soon.

The difficulty in compensation cases was not that the patients could not have massage, but that they did not want it. A large number of such patients are quite satisfied if they are getting compensation, and they do not want to return to work. Unless the patient voluntarily exercises himself and makes active movements with the muscles Mr. Cathcart defied the masseur to bring back power. That was one of the great difficulties in connection with the Workmen's Compensation Act.

A special department for the treatment of fractures such as Mr. Scott Carmichael suggested was, in Mr. Cathcart's opinion, unnecessary. When these cases were treated along with other conditions the students had their attention directed to them, and it was very important that they should see the treatment carried out; if all the fractures were put in one ward, where the students were not obliged to go into, they would not see as much of the treatment as they do at present.

He hoped the standard of treatment in the Edinburgh Royal Infirmary would be a very high one, and if they could turn out their students well instructed in the treatment of fractures they would be doing a very great deal for the benefit of the people of the country at large.

Edinburgh Obstetrical Society.

THE fifth meeting of the session was held on 13th March, Dr. Haig Ferguson, President, in the chair.

The President showed uterus and appendages removed for bilateral gonococcal pyosalpinx. Dr. Haultain showed a double pyosalpinx, probably of tubercular origin.

Dr. Hugh S. Davidson read notes on *three cases of transplantation of the ovary in the human subject*. They were people in whom palliative measures had failed. As all were women under 30, homoplastic grafting was attempted in order to obviate the menopause. One case was a complete failure, and showed distinct symptoms of the menopause. One was a comparative success in so far as menstruation returned and persisted for seven months, but was complicated by the appearance of a fibroid of the uterus; she had shown no menopausal symptoms. The third started to menstruate three months after the operation and had menstruated every month since. In none of them had there been any return of pain, either locally where the ovary was transplanted into the rectus abdominus, or "pelvic," at the time of the "periods." He considered it a superior method of treating pathological ovarian conditions to attempts at conservative surgery, as the transplanted portion had shown no signs of further change in its new situation, whereas pieces of ovary left *in situ* tended to become pathological and thus required a second operation. Though admitting that the graft might not be permanent, he contended that it produced a slowly appearing menopause and so a milder one instead of a sudden removal of ovarian internal secretion with the resultant severe upset of the general system.

Dr. Barbour, in discussing the paper, referred to the hæmorrhage which often occurred after removal of both ovaries and asked if one could call it menstruation. Had one any proof that an ovary engrafted into muscle could produce the same effects as a normal ovary; did ovarian secretion go on and was not this secretion itself dependent upon the formation and ripening of Graafian follicles as it ceased after the menopause? Had one any proof of maturation of follicles in a grafted ovary? Some patients after ovariectomy had no distressful symptoms, even when no grafting was done.

Dr. Ballantyne thought the main result of Dr. Davidson's case-records was to strengthen the claim already put forward for the benefit of transplantation, and suggested that it might be tried to insert a portion of the ovary into the

uterine muscle, allowing a portion to project into the uterine canal as had been done experimentally in rabbits and guinea-pigs, with the hope of impregnation being rendered possible.

Dr. Haultain had watched these cases and had been much struck with the results in the two later ones. He would like to know if the menopausal symptoms would be equally kept off when menstruation was not re-established. In such cases, should one leave the uterus alone and transplant the ovaries or remove the uterus and transplant the ovaries? In such cases of painful diseased appendages his practice lately had been to remove the uterus with the appendages because of the increased after-comfort to the patient, in which view he had been strengthened by a series of cases where the uterus took on malignant action when left behind. In his opinion the effects of removal of ovaries had been much exaggerated in the lay mind—a misapprehension, unfortunately, also fostered by some doctors. Only about 10 per cent. suffered severely from the induced menopause, 30 per cent. had some distress for a few years, and the remaining 60 per cent. did not suffer at all. In removal of ovaries there could be no harm and there probably was benefit in transplanting a portion of ovary into the muscle.

Mr Scott Carmichael referred to his experimental work in transplanting ovaries in 21 rabbits. Of these one was completely successful, 14 partially so, and 6 failures. The site of the transplantation probably had a great deal to do with the ultimate success, transplantation into muscle giving the best success. One attempt he made in the uterine muscle of a woman was a failure. From his experience he was convinced that ovarian tissue could live for a time after transplantation but in the long run he thought the ovary was bound to degenerate. It might be, however, that the amelioration of menopausal symptoms made transplantation worth doing. It must be a slice of ovary and not the whole organ that should be transplanted.

The President said his experience did not convince him that the ovaries were the cause of menstruation. He had known menstruation continue after the removal of the uterus and appendages for fibroid, where a fair piece of lower uterine segment had been left. These cases were free of menopausal symptoms. He agreed that the results of resection of ovaries were unsatisfactory. He agreed with Mr. Scott Carmichael that the grafts were likely to degenerate, but they let the patient down gently with the menopause. He had had good results in neurotic cases with ovarian extract.

Dr. Robert Robertson read a paper on "The Lateral Incision of the Perineum," which he described as applicable chiefly to cases of primiparæ, in prolonged labour in occipito-posterior labours, with rigid perineum. The incision he advocated was a right lateral one, done by means of scissors, and extending from the vagina to an inch outside the anus and for two inches up the vaginal wall. After delivery with forceps this was carefully stitched up in layers by iodised catgut, bringing the ends of muscle together. The skin was sewed with silkworm gut. He claimed for this incision that it saved detachment of the levator ani from the symphysis and prevented prolapse of the anterior vaginal wall. The stitching was also much easier than in the case of the usual central tear. He also advocated strongly the immediate repair of the cervix after labour.

Dr. Keppie Paterson, Dr. Haultain, and Dr. Ritchie, in discussing the paper, all expressed a preference for allowing tearing to take place in the

central position in cases where it was unavoidable, and for repairing it in the usual manner. The difficulty of foretelling what perineum was likely to give way was referred to. Dr. Fordyce had found formidable bleeding result from episiotomy, and had given it up in favour of a method of passing silkworm gut sutures through the perineum *before* the birth of the child, which were fastened up and tied afterwards. This latter method, suggested by Dr. Laphorn Smith, was more fully described by Dr. B. P. Watson, who said he had had most excellent results with it.

Dr. Bowie thought two small lateral snips were preferable to one long incision.

The President thought better results were obtained by waiting longer and allowing of head-moulding, when one would have little difficulty with the perineum.

In reply, Dr. Robertson said the poor resistance shown by town women to the strain of a long labour, and the exigencies of a busy practice, rendered it often impracticable to delay application of forceps as long as one would like. He had found one long lateral incision much easier to sew up than two small ones.

Dr. Archibald M'Kendrick and Dr. James Young gave a demonstration of an improved *method of measuring the internal diameters of the female pelvis in the living subject*, Dr. M'Kendrick taking up the X-ray and mathematical aspect of the subject and Dr. Young the anatomical. By their method the measurement of the transverse diameter was strictly accurate, but that of the conjugate was in a small percentage of cases liable to an error of about one-tenth of an inch.

Forfarshire Medical Association.

A MEETING of the Forfarshire Medical Association was held on 14th March, Dr. MacGillivray, Vice-President, occupying the chair.

Mr. A. Don showed two cases of *ununited fracture in the forearm* which he had treated by means of bone pegs in the medullary cavity.

Mr. Greig gave an account of an unusual case of *spondylitis* in a young man who on account of it had been invalided out of the Dragoon Guards. For eighteen months he had complained of pain in the right hip and thigh. Kneeling with the thigh in flexion gave relief. There was now some degree of atrophy of the muscles of the right thigh and calf. The patient (who was shown) presented dextro-concave scoliosis with stiffness of the spine. The trouble was in the right side of the lumbar spine with in addition two or three dorsal vertebræ. On two occasions the actual cautery had been applied and the patient had much improved. Mr. Greig entered into a discussion of the differential diagnosis of the case. Mr. Greig then showed three specimens of *hydronephrosis*, one of them a kidney of a woman who had double congenital dislocation of the hip, a circumstance which made the operation of removal a difficult one by the ordinary route. Mr. Greig also read a paper on a case of "stab wound in the heart" for which he had performed a trans-diaphragmatic pericardiotomy. The wound was inflicted by a fall from a hay-cart on a three-pronged hay-fork. One prong penetrated the left rectus muscle and the diaphragm, entered the pericardial sac and then pierced the wall of the left ventricle. It was impossible to say whether it had entered the cavity of

the ventricle, as the wound was plugged with clot. At the operation blood-clots were removed from the pericardial sac and the diaphragm was sutured. The boy was now perfectly well and able for his work. Mr. Greig then gave an interesting historical account of wounds of the heart, and quoted Guthrie, who a hundred years ago had said that a wound of the diaphragm never closes, and that it is constantly a source of danger to the patient from hernia.

Dr. Foggie demonstrated a case of *ulcer of the leg with epitheliomatous invasion* and a case of *lichen planus*. He showed specimens from a case of aneurism of the aorta with erosion of the ribs. The case was a man of forty-two, and a point of interest was that there had been leakage into the substance of the pectoral muscle. Dr. Foggie read a paper on a family defect, namely, "hyperextension of the fingers with, in the more marked cases, a tremor." The family consisted of a grandfather who showed hyperextension and tremor. Five out of the seven of his family were affected, and of the next generation five. He mentioned that such family defects were of importance in the study of Mendelism, and classed such cases with cases of night-blindness, ichthyosis and bradydactyly.

Dr. Kerr brought a case of syphilitic *dactylitis*. The patient was a girl of nine, and the condition was well marked in both hands.

Dr. Pirie gave a demonstration of "Some Recent X-ray Negatives."

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

By W. T. RITCHIE, M.D., F.R.C.P.,
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VARIETIES OF HÆMATOPORPHYRINURIA.

THE subject of hæmatoporphyrinuria is fully discussed by Hans Günther (*Deutsch. Arch. f. klin. Med.*, 1911, Bd. cv. S. 89). Hæmatoporphyrin, prepared from acid solutions, is an amorphous powder of brownish-purple colour which becomes yellowish-red when rendered alkaline. It is readily soluble in alkalies, dilute mineral acids, ethyl-alcohol, and ether, but is relatively insoluble in amyl-alcohol and chloroform. In solution it is decolourised by nascent peroxide of hydrogen. Like bilirubin and hæmatoidin, hæmatoporphyrin does not give any reaction with guaiac, aloin, and benzidin tests. In solution it gives a reddish fluorescence: if the solution be alkaline this appearance is best elicited by the addition of ferric chloride. On spectroscopic examination weak alkaline solutions of hæmatoporphyrin yield four bands—one between C and D, a second near D, a third between D and E, and a fourth between b and F.

Garrod detected traces of hæmatoporphyrin in the urines of the majority of healthy persons and in larger amounts in the urine of patients suffering from gout, rheumatism, chorea, tuberculosis, pneumonia, pleurisy, and lead-poisoning. Keyzer found traces of this pigment in the urine of 93 per cent. of normal individuals, and larger amounts in the urine of 70 per cent. of patients suffering from plumbism, valvular disease of the heart, pneumonia, tuberculosis, fevers, disease of the liver, etc. As to the origin of the pigment, it has been thought to be a derivative of hæmoglobin. Excessive destruction of hæmoglobin may conceivably result from accumulation of acids within the body, and the symptoms of SO_2 poisoning are indeed comparable to those of acute hæmatoporphyrinuria; but experimentally the alkalinity of the blood is not lowered by trional, and in sulphonal poisoning the administration of sodium bicarbonate in doses sufficient to render the urine alkaline does not prevent the onset of hæmatoporphyrinuria; moreover the absence of hæmatoporphyrinuria in various forms of anæmia, and the apparently normal state of the blood in cases of hæmatoporphyrinuria, indicate that the abnormal pigment is probably not due to excessive hæmolysis. Two other theories may be mentioned—the first is the endogenous formation of hæmatoporphyrin synthetically in some part as yet unknown, and the second is the exogenous origin of this pigment from the food. The whole question, together with the experimental study of the toxicity of hæmatoporphyrin, is dealt with by Günther.

Many urines containing hæmatoporphyrin in abundance also contain other pigments. Of these the most important is the amorphous red-brown pigment, urofuscin, and it is this which imparts to the urine the deep red, brown, or black colour. Urofuscin, which appears to be an intermediate product in the synthesis of hæmatoporphyrin, is precipitated from the urine by BaCl_2 , is decolourised by shaking with powdered zinc, and presents no characteristic spectrum. A urine containing urofuscin may by oxidation become purplish-black, so that the abnormal colour of the urine may not be detected in a freshly-passed specimen.

Günther describes the following groups of cases in which abnormal quantities of hæmatoporphyrin appear in the urine:—

1. *Acute Hæmatoporphyrinuria*.—Fourteen cases are recorded in the literature. In no instance could the cause be ascertained definitely. The age of the patients varied from 7 to 47 years, and 11 of the patients were females. The most striking sign is the abnormal colour of the urine, which resembles blood, claret, or port wine, or may be almost black. The urine is diminished in amount, its specific gravity varies from 1016 to 1032, it contains hæmatoporphyrin, and urofuscin may also be present. In only one case was there an excess of urobilin. As a rule blood and casts are absent. In the milder cases the symptoms have been abdominal pain, vomiting, and constipation. Rigors, fever,

headache, and pains in the joints are less frequent. In severer cases there have been insomnia, ischuria, vasomotor disturbances, cutaneous hæmorrhages, delirium, epileptiform seizures, and in four cases fatal ascending paralysis. In diagnosis chronic poisoning by sulphonal or trional must be excluded. Five of the fourteen recorded cases terminated fatally, but in the absence of paralysis the prognosis is favourable. The etiology of the disease is undetermined, and the benefit of alkaline treatment is still questionable.

2. *Acute Toxic Hæmatoporphyrinuria*.—The symptom-complex is observed in association only with chronic, not acute, poisoning by sulphonal, trional, or veronal. Günther analyses 56 cases—47 due to sulphonal, 7 to trional, and 2 to veronal. Only about 8 per cent. of the cases were males. The real cause of the condition is unknown, although clearly related to the misuse of the drugs in question. Large amounts of sulphonal may usually be administered without causing an excessive excretion of hæmatoporphyrin. To say that the hæmatoporphyrinuria is due to an idiosyncrasy affords no explanation. Moreover, toxic sulphonal paralysis may occur without hæmatoporphyrinuria arising.

The onset of symptoms is usually sudden. Marked constipation was noted in 42 per cent. of the cases. In 23 per cent. this was accompanied by vomiting and abdominal pain which may be so acute as to suggest intestinal obstruction. The urine is of red-brown, port-wine, or black colour, and seldom contains albumin, blood, or casts. Punctate hæmorrhages in the skin, or pigmentation resembling that of Addison's disease, may sometimes occur. In severer cases there are pains in the limbs and numbness or anæsthesia which may be widespread. Paralysis of the lower limbs is more frequent, and in at least 21·3 per cent. of the cases there was acute ascending paralysis, with involvement of the sphincters. Convulsions, ptosis, delirium, ataxia, and paralysis of the extensors of the forearms simulating lead paralysis have been observed. Nine cases were examined post-mortem. The condition of the organs varied considerably, and the only constant morbid appearances were inflammatory and degenerative changes in the kidneys. The characteristic gastro-intestinal symptoms, the paralysis, and the history of long-continued taking of sulphonal or trional render the diagnosis easy. In at least 54 per cent. of the cases the disease ended fatally; only six cases are recorded as having improved or recovered, three of them having been treated with sodium bicarbonate. In the case recorded by H. B. Cushing (*Montreal Med. Journ.*, xxxix. No. 9) death was due to hemiplegia.

3. *Chronic Hæmatoporphyrinuria*.—In the cases of this group the hæmatoporphyrinuria persisted for lengthened periods without any concomitant gastro-intestinal or nervous symptoms, but the photodynamic action of the hæmatoporphyrin in the tissues was manifested by hypersensitiveness of the skin to light. To the cases recorded by

Cant (1898) and Möller (1900) Günther adds a third. These cases presented a continued excessive excretion of hæmatoporphyrin in the urine, cutaneous eruptions resembling hydroa aestivale, with in one instance sclerodermic changes. Nervous phenomena were absent or inconspicuous, but prodromal digestive disturbances were present in two of the three cases.

4. *Congenital Hæmatoporphyrinuria*.—Nine cases have been reported. The symptoms of hæmatoporphyrinuria and hydroa aestivale commence in early childhood. The skin lesions are localised to the nose, ears, cheeks, and dorsal surfaces of the hands and fingers, and by the age of 18-45 considerable destruction of these parts has occurred. Schultz's case of pemphigus leprosus, Gagey's cases of xeroderma pigmentosum with hæmoglobinuria, Vollmer's case of hereditary syphilis with hæmatoporphyrinuria, and the cases of hydroa aestivale accompanied by hæmatoporphyrinuria are included in this group.

DIAGNOSIS OF DISEASE OF THE LARGE INTESTINE.

In disease of the large intestine the bismuth meal is of comparatively little aid in establishing or confirming a diagnosis. The bismuth injection per rectum, although but seldom used hitherto, seems likely to be more helpful. Yeomans (*Med. Record*, 1912, lxxxi. 159) recommends the injection to be given while the patient is in the Sims' posture, ten to fifteen minutes before he is examined. The photograph is to be taken while the patient is lying prone. The bismuth injection always traverses the colon as far as the cæcum, unless prevented by some mechanical obstruction—kink, stricture, tumour or fæces. When there are symptoms of abdominal pain, constipation, tumour (either palpable or suspected), or abnormal constituents such as mucus, pus, or blood in the stools, and when the usual clinical methods have failed to establish the diagnosis, this method of Röntgen-ray examination is indicated. The bismuth injection is not attended with any risk to the patient. By its use any abnormalities in the size or position and any tumour or stricture of the colon are revealed as clearly as by operation. Further, if an operation is necessary it can be planned out in advance, thus saving time and manipulation and lessening shock. And, lastly, the bismuth injections lessen the number of exploratory operations, and by establishing an early diagnosis enable an operation to be performed at an early date.

Haenisch (*Munch. med. Wochenschr.*, 1911, No. 45), writing upon the same subject, is in favour of screening the patient while the injection of bismuth is being given per rectum. The injection can thus be watched passing upwards along the intestine, and the site of any obstruction defined. The method is useful for the differentiation of spasmodic from organic stricture of the colon, and in defining the relation of palpable

tumours to the intestine. The diagnosis must always be controlled by the ordinary clinical methods of examination, and a positive diagnosis should never be founded upon the findings of a single Röntgen-ray examination. A control examination on a subsequent day should invariably be made.

SURGERY.

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At the Third Congress of the International Society of Surgery held at Brussels (see this *Journal*, January 1912) one of the three subjects of discussion was the diagnosis and treatment of colitis.

ACUTE COLITIS.

The discussion on acute colitis was introduced by E. Sonnenburg. He divides the cases into two groups, according as the disease extends throughout the colon or is limited to a segment of it. The diffuse type, often associated with gastro-enteritis, is of surgical interest only from the diagnostic standpoint; it is most frequently confused with appendicitis, and the differential diagnosis may be possible only after careful investigation of the blood. In the absence of leucocytosis colitis is the condition present, but if it is of a virulent type, as in ptomaine poisoning, or if the peritoneum is irritated, the leucocyte count may be raised. Then it becomes necessary to investigate the qualitative changes after the method recommended by Arneth.

The circumscribed type of colitis is of more interest to the surgeon. It is met with chiefly at the three flexures and in the cæcum. The anatomical relations which can now be made out by X-ray examinations have much to do with the determination of the favourite sites. Sometimes the infection is hæmatogenous, and sometimes it follows directly on such injuries as a blow on the abdomen. One of the most important factors is habitual constipation, which leads to lesions of the lining and to an increase in the number and the virulence of the intestinal bacteria. Sometimes the infection spreads from neighbouring organs—appendix, pylorus, gall-bladder.

The onset of acute colitis resembles closely that of other acute abdominal affections. The pains are severe and colicky, and their site corresponds more or less accurately to the affected segment of the bowel. The peritonitic type of pain frequently arises when the peritoneum is irritated. Cases of acute circumscribed colitis and peri-colitis rarely give rise to diffuse streptococcal peritonitis.

Acute sigmoiditis and *peri-sigmoiditis* often arise as the result of infection in false diverticula, and pre-existing constipation is frequently admitted. Along with slight fever, colicky pains, irregularity of the

bowels, and abdominal distension a palpable swelling gradually makes itself evident about the left Poupart's ligament. Pressure on the cæcum and ascending colon produces pain in the region of the sigmoid flexure, while pressure on neighbouring parts, even close to the tumour, produces no pain. In the more acute inflammations there is usually a localised œdema of the abdominal wall. A sausage-shaped area of resistance can usually be made out extending up in the iliac fossa. Occasionally it is nodular and tender to pressure. Sometimes the area is increased by inflammatory exudation, and a dull note may then be obtained on percussion. The condition may go on, say in a dysenteric case, to abscess formation, when it becomes difficult to differentiate from perityphlitis. In subacute forms the tumour is hard and tender, and the stools contain mucus, pus here and there, and sometimes blood. Adhesions to other structures tend to form. As loss of weight is a prominent feature it is difficult to distinguish the inflammatory mass from a malignant tumour.

At the *hepatic* and *splenic flexures* acute colitis is met with only in adults, and more frequently in women. The chief factor is obstipation with its associated catarrh. When the bowel is loaded, the mere position and fixity of the splenic flexure may cause obstruction and determine an inflammatory attack either there or in the hepatic flexure or cæcum. There is rarely a palpable tumour in disease of either flexure. The duration varies widely, exacerbations and recurrences are common, and the disease may become chronic, with the production of stenoses.

In the *cæcum*, where the intestinal contents are normally soft, constipation with the formation of scybalous masses is a less important factor except when the cæcum is abnormally mobile or displaced. Its blood supply is, however, poor in comparison with that of other parts, and its musculature is feeble and prone to atony. These factors help to explain the frequency of inflammatory attacks and the distension of the cæcum, which is always prominent. Further, it may be infected by spread from the appendix. More important to the surgeon is the possibility of a secondary appendicitis arising by spread from the cæcum, and of this nature are many of the cases of appendicitis that develop after severe diarrhoea. Clinically they show distension of the ileo-cæcal region due to atony of the cæcum, no pyrexia, constipation alternating with diarrhoea, absence of leucocytosis, but presence of the qualitative changes in the blood that are typical of colitis. The inflammation lasts as long as that in the cæcum, and does not tend to recur. The prognosis is favourable so long as the appendix empties itself easily, and operative treatment is unnecessary.

In general, surgical measures such as appendicostomy, the formation of an artificial anus, and the exclusion of the diseased segment have not been employed in acute colitis. The usual régime is rest in bed and light fluid diet, with cold compresses or an ice-bag applied to the

abdomen. Nowadays aperients are administered, and of these castor-oil is the best. Later bismuth subnitrate or salicylate may be given in combination with magnesia. For effusions hot fomentations and hot air baths may prove useful. When these measures fail to bring improvement, or when the diagnosis from malignant disease is doubtful, recourse must be had to laparotomy. Excision of the mass may be difficult owing to adhesions. If typhlitis is found and the appendix is normal, the removal of the latter is, to say the least, superfluous.

CHRONIC COLITIS.

Three communications on chronic colitis were presented to the Congress. C. L. Gibson confined his remarks to the operation of valvular caecostomy, which he was the first to suggest; D'Arey Power reviewed the present-day opinions held in Britain regarding colitis; and P. Segond dealt with the types suitable for surgical treatment, the indications for operation, and the results obtained by different operative procedures.

Etiology.—It is only in a few cases that a definite cause can be assigned for the disease—actinomycosis, glanders, syphilis, pneumococcal or gonococcal infection. The majority of the cases that come to operation are merely “ulcerative” colitis, infective in origin, usually extensive, and extremely intractable. Segond takes exception to the indefiniteness of the term, ulcerative colitis, used by British and American writers, but he admits that a complete classification is not necessary for the surgeon. It is, however, necessary to distinguish between pure and symptomatic colitis, the latter occurring in association with intestinal carcinoma or polypus, chronic appendicitis, utero-ovarian disease, and other para-intestinal affections.

As met with in Britain, ulcerative colitis is preceded by long-continued signs of weakness in the mucous membrane of the colon. Some of the cases begin shortly after parturition or abortion. After the weakness comes chronic irritation, with an increased secretion from the crypts of Lieberkühn and a desire frequently to go to stool. Slowly following on the irritation comes ulceration, marked by the presence of blood, pus, and offensive stools, and by a condition of profound toxæmia. Except in asylums the disease has not occurred epidemically in Britain for more than fifty years.

Morbid Anatomy.—In most of Lockhart Mummery's cases a definite granular inflammation of the mucous membrane was present, always most marked at the flexures and on the valves of Houston. Many in addition showed ulceration. The ulcers are sometimes shallow, sometimes deep, and in the latter, which is the more dangerous type, the intervening ridges of healthy mucous membrane stand out prominently like polypi, and some of the tags of mucous membrane may coalesce and form tunnels or arches. The lesions rarely give rise to perforation

of the bowel or abscess of the liver. It is the associated toxæmia that constitutes the danger to life.

Symptoms.—It is well to note that the severity of the symptoms does not correspond with the severity of the local lesion, but pain is often a marked feature. Though anæmic the patient may not lose flesh, and he may seem to be merely listless and lazy, though the sigmoidoscope reveals a serious lesion. The anus loses its tone, and as soon as it is dilated a foul-smelling discharge escapes. The blood-vessels of the mucosa bleed easily when they are touched. The general condition depends on the toxæmia, of which the temperature forms a trustworthy guide. The urine may show the characters associated with chronic Bright's disease. Occasionally colitis leads to a generalised peritonitis or localised abscess.

Three clinical types of the disease are to be distinguished :—Grave cases with diarrhoea or hæmorrhage; less severe cases of muco-membranous colitis, ulcerative or not, with spurious diarrhoea; and cases of dry colitis, with constipation as a more or less marked symptom.

Indications for Operation.—Segond holds that surgical treatment is never indicated at the outset, but should only be undertaken in a grave case in which medical treatment has proved a failure. On the other hand operation should not be looked on merely as a last resort in apparently hopeless cases. It ought to be practised before the large intestine has become greatly thickened and sodden with inflammatory products. If it fulfils its promises, appendicostomy will come to be performed at an earlier stage than at present, to aid medical treatment. Acute exacerbations coming on in the course of the disease, grave hæmorrhage and threatenings of obstruction are further indications for operative treatment.

The *principles* at which the surgeon aims are to keep the diseased bowel at rest by procuring deviation of the intestinal contents, as in ileo-sigmoidostomy, and the establishment of an artificial anus: to cleanse the canal by copious irrigations, and to act directly on the lesions by medicinal agents, as in appendicostomy and cæcostomy. Along with these measures an attempt should be made by means of vaccine therapy to render the tissues immune.

Methods of Operation.—The establishment of an artificial anus has usually been carried out too late, and the mortality has been high. As it is difficult to ascertain how far up the colon the lesions extend, and ileostomy is not to be recommended, colostomies should be done as seldom as possible. A cæcal anus is best, and this mode of treatment will always have a place in urgent cases, to afford immediate rest to the colon. The early results of cæcostomy are good, but the permanency of the improvement is doubtful, and it is only rarely that the artificial anus can be closed, unless ileo-sigmoidostomy is first performed.

For the treatment of colitis by ileo-sigmoidostomy, it is essential that the rectum and sigmoid flexure should be free from disease, hence in dysenteric colitis, which furnishes the majority of surgical cases, it is usually contra-indicated. In certain cases of mucomembranous colitis, and in those in which constipation is the predominating symptom, it may be performed at the outset, but Segond thinks that even in these conditions it is advantageous to begin with appendicostomy, and only if it fails have recourse to ileo-sigmoidostomy. With regard to technique, the space between the apposed mesenteries of the ileum and sigmoid colon should be obliterated by sutures to prevent the risk of subsequent strangulation. In cases of stricture of the colon or tumour around it, it may be necessary to combine ileo-sigmoidostomy with partial resection of the colon. At present total colectomy is still on its trial, but Segond is of opinion that the incurable nature of ulcers of the large intestine, the profound changes in its wall and cicatricial kinks may indicate the performance of an extensive, if not total, colectomy.

Except in extremely grave cases in which cæcostomy is preferable, appendicostomy or fistulisation of the cæcum is the operation of choice. Comparing the two operations D'Arcy Power says that appendicostomy leads to less disturbance of the parts, and the opening is more easily closed when no longer needed. In highly septic patients in whom the skin over the transposed appendix may slough, he recommends bringing the appendix vertically up to the skin instead of obliquely through the wall. Segond advises that the catheter should be immediately placed in its lumen, and early lavage carried out. The usual fluids for irrigation are saline solution and boiled water, the latter being used especially when treatment with silver solutions is to follow. Other antiseptics may be used, and Körte, following the practice of Indian surgeons in amoebic dysentery, injects an infusion of ipecacuanha, 1 in 1000. In some patients it is found impossible to perform irrigation at all, and in the majority the colon soon becomes intolerant even of dilute solutions, and must be left untreated for a time. In flushing through an appendicostomy opening it is advisable from time to time to distend the colon by plugging the rectal tube in order to clear pus from the pockets that tend to form.

With the commencement of irrigation there is invariably a marked improvement, and often in the slighter cases a permanent cure. More frequently there are several ups and downs before the satisfactory end result is obtained.

According to D'Arcy Power the value of appendicostomy lies in lowering the temperature, lessening the pain, improving the appetite, and so prolonging life till the patient may become immune. He has come to the conclusion that if vaccine therapy is to be successful it must be employed quite early and persisted in for a long time.

OBSTETRICS AND GYNECOLOGY.

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and

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THE CHANGES IN THE POSITION AND RELATIONS OF THE THORACIC
AND ABDOMINAL ORGANS AS THE RESULT OF PREGNANCY.

THE determination of the position of the various thoracic and abdominal organs by means of the shadows thrown on the screen by X-rays has been rendered reliable and accurate by the ortho-diagraphic method. By this means the exact outline of each organ can be obtained free from any distortion, and the relationship of the individual organs to each other exactly determined. In the case of the different parts of the alimentary canal bismuth is made use of to obtain the shadow. Working in this way Raulot-Lapointe and Thomas (*L'Obstétrique*, December 1911) have investigated the position of the thoracic and abdominal viscera as modified by pregnancy and have got some very interesting results. They have examined altogether 72 women at different stages of pregnancy, and in one case—a normal primipara—have obtained a complete series of diagrams showing the altering relationships from the earliest stage of pregnancy up to two months *post-partum*.

During the first two months there is no departure from the normal non-pregnant condition except that the stomach shows a larger part occupied by air. This excess of gaseous distension the authors believe to be due to the increased salivation present at this time and to the swallowing of air with the saliva. They have noted its presence in all cases, but in patients with a great deal of nausea and sickness the air chamber is always large.

By the third month the uterus can be outlined rising above the pubes, and from this time onwards alterations in the position of the abdominal organs can be noted. The stomach at this time is not so vertical in direction, but is inclined obliquely with the pylorus lying to the right side of the middle line. This displacement is due to the fundus of the uterus pushing up the coils of small intestine. In cases of gastric dilatation and ptosis the large curvature of the stomach may at this stage of pregnancy lie upon the fundus. At the sixth month the stomach is still more oblique, so that the pylorus and part of the great curvature are well to the right of the middle line. The great curvature is in direct contact with the uterus, this contact first occurring at the fifth month. The cæcum is elevated, and part of it lies between the uterus

and the anterior abdominal wall. The angle between the ascending and transverse colon has become more obtuse, so that these two parts of the intestine are practically in one straight line. The transverse colon passes in front of the lower part of the stomach. A little later it can be seen that the stomach has acquired an obliquity from before backwards, so that the great curvature is interposed between the uterine fundus and the transverse colon and anterior abdominal wall. In dyspeptics with dilated stomachs this support of the greater curvature by the fundus of the uterus, together with the increased obliquity towards the right, causes a relief of symptoms. By the eighth month the stomach has become more oblique from left to right and from behind forwards, so that the pylorus and prepyloric region are situated in the right flank and the great curvature is in front of the fundus. The ascending and transverse colon no longer form an angle with each other, and the latter is in front of the great curvature of the stomach, which rests on the uterus like a flaccid bag.

At the eighth month the uterus attains its greatest height in the abdomen, and from this to full term it tends to fall forwards and develop towards the front. The great curvature of the stomach is now resting on the posterior aspect of the uterus, and the antero-posterior obliquity is thus diminished.

After delivery a very interesting state of things is seen. The earliest records the authors give are those obtained eleven days *post-partum*. In the stomach the chamber of air has entirely disappeared, but the whole organ is displaced downwards, so that the lowest part is 2 cm. below the intercrystal line, and rests on the displaced transverse colon, which is on a level with the pubes. The cæcum and appendix are entirely within the true pelvis, and even the angle between the ascending and transverse colon is below the level of McBurney's point. This angle has resumed its ordinary acute character, and the transverse colon forms a sort of festoon in the concavity of which the fundus of the stomach rests. The whole picture is that of a general ptosis. At the end of a month this downward displacement is still marked, and it is only after two months that the organs return to their normal position. This general proptosis is apparently due to the relaxation of the supports resulting from their disuse during the latter part of pregnancy when the fundus of the uterus is lifting up these organs. We can understand how repeated pregnancies may render this downward displacement of the organs permanent.

The changes in the diaphragm and thorax are also interesting. By the sixth month the diaphragm has become elevated and the base of the thorax enlarged. The heart rests more on the diaphragm than normal. At the eighth month the base of the thorax is still further enlarged and the concavity of the diaphragm almost obliterated. The heart rests still more on it, and its area has apparently increased. In

reality there is simply a raising of the apex, the heart becoming tilted so that the transverse diameter becomes increased and the vertical diminished. Clinically this results in an outward displacement of the apex and an increase of percussion dulness to the left, signs which have formerly been interpreted as due to hypertrophy resulting from the pregnancy. These results show that in a great number of cases this interpretation is wrong, and all that has happened is this tilting up of the apex by the diaphragm. In contrast to the abdominal organs the thorax, diaphragm, and heart rapidly return to normal after delivery.

URETERAL CATHETERISATION IN THE PYELITIS OF PREGNANCY.

Pyelitis is now recognised as a fairly common complication of pregnancy. It generally arises during the later months of gestation, and the symptoms are high fever, often accompanied by rigors, headache, vomiting, and pain and tenderness in the renal region—symptoms which formerly often led to a diagnosis of appendicitis. There is usually frequency of micturition, and pus is found in the urine. Glendinning (*Arch. of the Middlesex Hospital, Clinical Series*, No. 8) points out the importance of catheterisation of the ureter in such cases, both as an aid to diagnosis and as a means of treatment. There is still a great deal to be determined about the mode of infection and the early manifestations of the condition, but the author believes that the ureter in some part of its course is first affected. The right side is much more frequently affected than the left, and the usual organism is the bacillus coli communis. The changes in the ureter are those of acute inflammation, and there is a great tendency to constriction of the lumen, especially at two points, viz. opposite the cervix uteri and at the level of the pelvic brim. These constrictions may be sufficient to intermittently obstruct the lumen, causing accumulation of pus in the pelvis of the kidney and aggravation of the symptoms. In treating such a condition it is therefore not always sufficient to administer urinary antiseptics or the appropriate vaccine, but it is necessary to re-establish the ureteric canal and drain the kidney. This is easily done by the passage of the ureteral catheter. The bladder is washed out with a flushing catheterising cystoscope until the fluid returns clear. The presenting part of the child is displaced from the pelvic cavity by pressure with a finger in the vagina, and the ureteral catheter is then passed. The affected side is recognised by the inflammatory change round the orifice. Difficulty may be experienced in getting the point of the catheter past the two points mentioned above where constriction is common, but this can with patience generally be overcome. When the point has reached the renal pelvis the pus is evacuated by a small aspirating syringe, and if the pus is too thick to flow the pelvis is gently flushed with normal saline solution. In any case the catheter is left *in situ* for from two to

four hours. It is claimed for this method that it establishes the diagnosis, relieves pain, and reduces temperature. It may have to be repeated, but if properly carried out will effect a cure even of cases which, with other methods of treatment, would have called for terminating the pregnancy. The author describes several illustrative cases.

THE CLINICAL ASPECTS OF TUBAL GESTATION.

Mackenzie (*Journ. of Obstet. and Gyn. of the Brit. Emp.*, December 1911) makes an interesting analysis of the history and symptoms of one hundred and fifty-five cases of extra-uterine pregnancy treated in the London Hospital between 1898 and 1905. He finds, as we would expect, that a careful review of these cases does not bear out the accounts of the condition generally given in the text-books. He finds that as regards age the most likely time for such a pregnancy to occur is between 25 and 30, and as regards duration of married life between the sixth and tenth years. In 15 per cent. there had been no previous pregnancy, while in 30 per cent. there had been only one child. In 80 per cent. there had been three or fewer previous pregnancies. The statement that in the majority of cases of tubal pregnancy a number of years has elapsed since the birth of the last child is not borne out by Mackenzie's statistics, for in 42 per cent. there was a two years' interval or less. Another common assertion, viz. that there is in most cases a history of previous pelvic inflammation, is also refuted, as in only 16 per cent. was such a history obtainable. He next deals with the three common symptoms—amenorrhœa, vaginal discharge, and abdominal pain. There was no amenorrhœa in 25 per cent. This is a most important fact, because we must be prepared to diagnose tubal pregnancy in some cases in the absence of this important symptom. In only 4 per cent. was pain absent. Of the others over 90 per cent. had a sudden severe onset of pain, and in most instances this was accompanied by red vaginal discharge. There is nothing characteristic about the discharge, and in only twenty-five is it definitely stated that a decidual cast was passed.

DISEASES OF THE EAR, NOSE, AND THROAT.

By A. LOGAN TURNER, M.D., F.R.C.S.,
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and
W. G. PORTER, M.B., F.R.C.S.

THE AUDITORY NERVE AND SALVARSAN.

SINCE salvarsan has come into general use attention has been drawn to a possible secondary action, namely, its effect on the 8th nerve

The disturbances may be confined to the cochlear division, or to the vestibular division, or both portions of the nerve may be affected. In other cases the changes are not limited to the 8th nerve, but may also involve other cranial nerves. Affections of the 8th nerve are, however, much more common than those of the other cranial nerves.

Valentin (*Zentralbl. f. Ohr.*, Bd. ix. Hft. 11, 12) has collected reports of 45 cases of affection of the nerve which occurred after the exhibition of salvarsan. Of these 9 involved the cochlear division, 7 the vestibular division, and in 20 both portions of the 8th nerve were affected, while in the remaining 9 cases, in addition to the 8th nerve, other cranial nerves were involved. Valentin quotes Benario (*Munch. med. Wochenschr.*, 1911, No. 14), who out of at least 14,000 cases treated by salvarsan found only 126 cases of neuro-recurrence, of which 62 affected the 8th nerve. The following questions are put by Valentin:—
1. Is this complication to be looked upon as a syphilitic process?
2. Is it due to the action of the drug? 3. Does salvarsan make the nervous system particularly vulnerable to a syphilitic process? 4. Is it a neuro-toxic appearance due to the poisons set free from spirochaetes which have been destroyed by the salvarsan?

With regard to the first question some authorities have stated (Finger, *Berl. klin. Wochenschr.*, 1911, No. 18; Alexander, *Wien. klin. Wochenschr.*, 1910, No. 50) that in the early stages of syphilis labyrinthine affection is very rare, in fact almost unknown. Frey (quoted from *Zentralbl. f. Ohr.*, Bd. ix. No. 6), however, specially investigated this question, and was able to show that Alexander's statement was incorrect, and he states that although the question whether the exhibition of salvarsan is a source of special danger to the 8th nerve has not yet been solved, the argument can no longer be raised that early syphilitic lesions of the 8th nerve were unknown before the days of salvarsan. Other authors have come to the same conclusion.

Ehrlich (606 in *Theory and Practice*, Lond., 1911, and *Munch. med. Wochenschr.*, 1911, No. 1) believes that the lesions of the cranial nerves after the administration of salvarsan are due to syphilitic recurrences. In the *therapia magna sterilizans* it is probable that the spirochaetes in the nerve have not been brought into contact with the arsenic owing to the poor vascularity of the nerve and have multiplied locally. In addition to this the anatomical configuration plays some part, as a slight swelling of the nerve will cause it to become compressed in its narrow bony canal. As the nerve affection is the single lesion and there are only a few spirochaetes a negative Wassermann is obtained. Against the toxic action is the fact that these cases have improved on antisyphilitic treatment, and, further, that affections of the ear and eye, when of syphilitic origin, are markedly benefited by the treatment. The Herxheimer reaction (disturbances appear soon after the injection which again disappear after a short time) may also be observed in the

case of these nerves. Herxheimer's reaction only appears when the dose given has been too small.

With regard to the second question, "Is the drug responsible for the nerve lesion?" Finger (*Wien. klin. Wochenschr.*, 1910) is strongly in favour of this explanation. He reports three cases of lesions of the 8th nerve after the administration of salvarsan. In the first, a case of tertiary syphilis, nystagmus and giddiness set in a day after the injection, but the hearing was unimpaired; this isolated affection of the vestibular nerve passed off in a few days. This case is to be looked upon as one of Herxheimer reaction. The second case was one of syphilis of 6 weeks' duration, and 9 weeks after the injection a bilateral labyrinthine deafness developed which did not clear up—Wassermann negative. In the third case the syphilis was of three months' duration, and three months after the injection nerve deafness appeared and did not pass off—Wassermann negative. In the author's opinion these last two cases are to be looked upon as due to the drug.

Valentin has only found one case in the literature (Milian) in which disturbance of the 8th nerve has appeared after the injection of salvarsan in which the patient was not suffering from syphilis, but the case is not beyond exception, as Hektin had previously been administered. Moreover Finger, Stern, Levy, Port, and others believe that the ear affections are due to the drug.

Rille (quoted from Valentin, *loc. cit.*) suggests that in these cases there are two neuro-toxic poisons (arsenic and syphilis), of which the one provides the other with a site of lowered resistance. In light of this it appears that in many of the cases of neuro-recurrence in the 8th nerve the hearing had been previously impaired (Beck, Felix, David). These authors recommend that the hearing should be carefully examined in every case before the injection of salvarsan, and Valentin advises that those whose work subjects them to loud noises should desist from such work for a time. Finally, it may be argued that the number of neuro-recurrences is so small in comparison with the enormous number of patients who have been treated with salvarsan, and that as it is by no means certain that the arsenic is the cause of these lesions, we may conclude that this danger is not a contra-indication to the use of salvarsan except, possibly, when there is already a non-syphilitic lesion of the ear.

THE TREATMENT OF TUMOURS OF THE HYPOPHYSIS CEREBRI BY THE INTRA-NASAL ROUTE.

In the treatment of tumours of the pituitary body two surgical procedures have been recognised, namely, by the intra-cranial and by the extra-cranial route. Our attention at the present moment is directed to the latter. The anterior lobe of the pituitary, which is the glandular or secreting portion of the body, and is developed as a

tubular diverticulum from the buccal cavity, is situated in the anterior part of the sella turcica. Anatomically, therefore, it lies in relation to the roof of the sphenoidal sinuses. When these cavities are well developed the intervening bony plate is very thin. If, on the other hand, the cavities are small, the floor of the sella turcica is rendered thicker by the interposition of the cancellous body of the sphenoid bone. The relation of the meninges to the pituitary body has an important bearing upon the operation by the extra-cranial route. Although a part of the brain the pia mater and the arachnoid do not supply a covering to it. It lies in a recess formed by two layers of the dura mater. In operations, therefore, upon the pituitary the subarachnoid space is not opened into.

Surgical interference by way of the nasal cavities was carried out by Schoffer in 1907. The procedure adopted by him was briefly as follows:—A skin incision was made along the left side of the nose; the nasal bone was detached and turned over to the right. The nasal septum and turbinated bodies were then removed, along with the nasal wall of the maxillary sinus. After removal of the frontal process of the upper jaw the ethmoidal labyrinth was destroyed and the sphenoidal sinus opened. The roof of this cavity was then chiselled, the dura mater divided, and the tumour removed with a sharp spoon. This operation, slightly modified, was performed by a number of surgeons with varying success. Up to the year 1911 the results have been tabulated as follows:—Operations, 53: successful, 32: fatal, 21: mortality, 39 per cent.

These cases have been carefully analysed by Hirsch, and as a result of his observations he came to the conclusion that the external operation through the face did not permit of complete removal of the tumour, and that it would be preferable to carry out an operation through the nasal cavities without much loss of blood, and further, without a general anæsthetic. The procedure which he adopted upon a woman suffering from blindness due to a cyst of the pituitary consisted in removal of the middle turbinated bone, followed by removal of the anterior wall and then the roof of the sphenoidal sinus. Normal vision returned in the right eye within seven months, but the left eye remained blind. The patient died sixteen months after the operation in an epileptic seizure. The post mortem showed that the cyst had not re-formed.

After his experience with this case Hirsch sought for a method which would allow him to freely expose the pituitary in the mesial plane. For this purpose he employed the submucous resection of the nasal septum, removing the septum as far back as the rostrum of the sphenoid, and even further—to the anterior walls of the two sphenoidal sinuses, which were then destroyed so as to expose the floor of the sella turcica. After chiselling through the bone and slitting the dura

matter the tumour is removed with a sharp spoon. The whole operation is carried out under local anæsthesia.

Hirsch has treated twelve cases in this way—ten successfully, and two with a fatal issue. An analysis of these cases is interesting. Eight were females and four were males. The ages of the women varied from 23 to 57 years, and of the men from 33 to 69. Disturbances in vision were reported in ten of the cases, and four of the women suffered from cessation of menstruation. The various lesions were classified as follows:—Cysts, three: simple adenoma, three; malignant adenoma, one: epithelial carcinoma, two: and in three the variety of tumour was not stated. In none of the cases, however, would it appear that the whole of the tumour was removed. In the majority of the cases the symptoms of blindness, acromegaly, and headache were markedly relieved. Improvement in the symptoms may be expected if the greater part of the tumour is within the sella turcica or is of a cystic nature. If the tumour develops intracranially, only very slight improvement is to be looked for whatever kind of operation is carried out. Hirsch is of the opinion that a new territory is thus opened up for the nasal surgeon (*Verhandl. des III. Internat. Laryngo-Rhinolog. Kong.*, Berlin, 1911).

A NOTE ON THE ETIOLOGY AND TREATMENT OF CHRONIC PHARYNGITIS.

Guttman has investigated this point in a large number of cases. He was struck with the fact that in the examination of the throats of two hundred men who worked in a dusty atmosphere no symptoms were complained of, in spite of the local hyperæmia, dilated vessels, granules, mucous secretion and dried secretion. He therefore undertook a further investigation upon individuals who complained of burning sensations in the throat, dryness, or hawking. He carefully excluded any pathological condition of the nose and faucial tonsils. Having observed in his own person that he suffered from considerable discomfort in the throat when he had dyspeptic symptoms, he proceeded to make an inquiry and investigate the reaction of the gastric secretion in two hundred and thirty-one individuals complaining of the above symptoms. A test breakfast was given, and an hour later the stomach contents were withdrawn and their acidity tested. He then found that 179 showed hyperacidity, 38 hypoacidity, and only 14 gave a normal reaction. The interesting point which must be emphasised is this, that only 70 of these patients complained of any gastric discomfort, and only a few of them spontaneously made the statement that they suffered from gastric trouble: the remainder admitted it only on being questioned. Treatment was directed towards the correction of the acidity. In those cases in which there was a marked degree of hyperacidity, magnesia and bicarbonate of soda were

administered; in less marked cases bicarbonate of soda along with dieting; and where there was a deficiency of the acid, dilute hydrochloric acid and a diet. Of the 231 cases 137 reported themselves later, and of these 133 were either entirely relieved of their throat symptoms or were very much improved; in only four treatment had produced no result (*Verhand. des III. Internat. Laryngo-Rhinolog. Kong.*, Berlin, 1911).

PATHOLOGY.

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TUBERCULOSIS IN CHILDREN.

It is interesting to those of us who have maintained throughout the importance of the doctrine of the danger to young children of milk from tuberculous cows to note how the pendulum of opinion is slowly but surely swinging back towards the position it occupied before Koch delivered his memorable paper at the London Tuberculosis Congress in 1901.

The Royal Commission has now issued its final report, which states that tuberculosis may be communicated to man from infected cow's milk and from tuberculous meat, either beef or pork. Moreover, the Commissioners more particularly urge the Government to take action "to avert or minimise the present danger arising from the consumption of infected milk."

Confirmation of the validity of these doctrines comes from New York, in a striking paper on the "Relative Importance of the Bovine and Human Types of Tubercle Bacilli in the Different Forms of Human Tuberculosis" (Park and Krumwiede, *Journ. of Medical Research*, Boston, December 1911, p. 313). These authors investigated, by cultural and experimental methods, 478 fatal cases of tuberculosis, occurring mostly in children. Out of the 478 individuals 116 were under 5 years of age at the time of death, and of this number 25 had been infected with the bovine bacillus. Of the remaining 362 cases only 10 had been infected with that bacillus. As the ages increased beyond 5 years the incidence of human infection rapidly increased, whereas that of the bovine infection rapidly diminished.

Taking the cases occurring during each of the first 5 years of life, that being the period which is very important, as during it milk usually forms an important constituent of the diet, Park and Krumwiede show that during the first year of life human infection was almost the rule; during the second year 7 cases out of 32 were of bovine origin; during the third year 1 case out of 11, and during

the fourth year 1 case out of 5 were of bovine origin. The single case occurring during the fifth year was of human origin. Thus they demonstrated that the bovine infections occurred chiefly during the second year of life, just as anyone who believes in the infective power in infants of the milk of tuberculous cows should expect.

In a small series of cases of tuberculosis from the Foundling Hospital, where the children are fed exclusively on cow's milk, an excessively high incidence (5 out of 9 cases) of bovine infection was encountered.

Further, it is highly interesting to note that the whole series of 478 tuberculous cases includes only 7 cases of abdominal tuberculosis, four of which were of bovine origin; it includes 55 cases of tuberculosis of the cervical glands, of which 21 were of bovine origin; and only 18 cases of tuberculosis of bones and joints, all of which were of human origin, or, more correctly, the bacilli separated from them were of the human type. Moreover, the great bulk of the cases of generalised tuberculosis occurring under 5 years of age and all the cases of pulmonary tuberculosis were human infections.

In addition, the authors analyse 746 similar cases investigated by other authors—Burekhardt, Gaffky, Rothe, Möllers, Bulloch, and Fabyan—and find that of the whole 1224 cases 280 had died during the first 5 years of life. Sixty-five out of the 280 proved to have been bovine infections.

The following table gives the percentage incidence at the different age-periods of all the bovine infections encountered amongst the 1224 cases :—

PERCENTAGE INCIDENCE OF BOVINE INFECTION.

Diagnosis.	Adults 16 Years and Over.	Children 5 to 16 Years.	Children Under 5 Years.
	Per cent.	Per cent.	Per cent.
Pulmonary tuberculosis	0·0	0·0	4·1
Tuberculous adenitis (cervical).	3·6	36·0	58·0
Abdominal tuberculosis	22·0	46·0	59·0
Generalised tuberculosis	2·7	40·0	23·0
Tuberculous meningitis (with or without generalised lesions) .	0·0	0·0	13·6
Tuberculosis of bones and joints	3·5	7·3	0·0

Note.—Rothe separated a bovine strain from one case of pulmonary tuberculosis.

“This table indicates only the incidence, and nothing as to the severity of the disease. It includes many latent and slight infections, which may never have had any effect upon the health of the child, had not some intercurrent infection led to death.”

Park and Krumwiede are confident that the percentage of deaths from bovine tuberculosis in young children, viz. $6\frac{1}{2}$ to 10 per cent., as deduced from their cases, is applicable to most cities throughout the world whose milk-supply is similar to that of New York.

It should be remembered that Park and Krumwiede's percentages, being of fatal cases only, represent only a fraction of bovine infections in children, as there is no doubt that partial or complete recovery is more frequent in these infections than in infections with the human bacillus. Further, following the safe rule seldom appreciated, that statistics based upon the experiences of any one country are not in their entirety applicable under the different conditions of life prevailing in any other country, the figures presented in this paper may be accepted as probably only approximately correct for this country, in which, for example, abdominal tuberculosis and tuberculosis of bones and joints are much more common than in the United States. The greater prevalence of abdominal tuberculosis in this country would tend to support a belief in a greater incidence of bovine infections here, but as yet there is no very clear evidence of the correctness of such a belief.

From the point of view of the individual, however, even more important than variations in racial susceptibility is the variability in *familial* susceptibility. Without doubt some families are more susceptible than others to infection from tuberculous milk, a fact which is far too commonly disregarded.

CUTANEOUS REACTION IN SYPHILIS.

Noguchi has already reported his success in cultivating the *treponema pallidum* in artificial media outside the body, and lately he has been employing these cultures for inducing a skin reaction for syphilis analogous to von Pirquet's cuti-reaction for tuberculosis. (*Journ. of Experimental Medicine*, New York, 1911, vol. xiv. No. 6, p. 557.)

The *treponemata* are cultivated in ascitic fluid and in ascitic agar, each tube containing a piece of sterile placenta. Cultures upon these media are ground up together until a perfectly liquid fluid is obtained, which is then heated at 60° C. for an hour and 0.5 per cent. carbolic acid is added. This substance is named luetin by Noguchi.

It was first tested by intra-dermic injection, (1) in rabbits previously inoculated with living or killed *treponemata*, grown in the testicles of rabbits; (2) in rabbits suffering from syphilitic orchitis; (3) in rabbits which had been cured of syphilitic orchitis by injection of *salvarsan*; and (4) in control normal rabbits. Groups 1 and 2 gave local inflammatory reactions, which disappeared in ten days. The 3rd and 4th groups gave only a slight transitory erythematous reaction.

Thereafter Noguchi applied the test in 400 cases in man—in 177 syphilitics, in 77 parasyphilitics, and in 146 control cases which were

not suffering, so far as could be ascertained, from any of the recent or remote manifestations of syphilis. Luetin was found to induce a distinct cutaneous reaction in syphilitic and in parasyphilitic patients, which was most constant and sure in presence of the tertiary and hereditary manifestations. During the primary and secondary stages the reaction was infrequently obtained, and, when present, was of a mild degree. An exception was found in cases in which energetic treatment had been or was being carried out, especially in treatment with *salvarsan*, and in which clinical signs of syphilis were absent. Such cases may show a distinct reaction.

It remains to be determined in how far the cutaneous reaction with luetin can be employed to supplement the Wassermann reaction in determining the complete and permanent suppression of a syphilitic affection. It appears probable that the Wassermann reaction is more constant in the primary and secondary and the cutaneous reaction in the tertiary and latent forms of syphilis. Moreover, it appears that the Wassermann reaction is more directly and immediately affected by antisymphilitic treatment than is the cutaneous reaction.

Noguchi is attempting to produce a more active preparation of luetin which may bring about a more distinctive reaction.

PUBLIC HEALTH.

By WM. ROBERTSON, M.D., D.P.H.,
Medical Officer of Health, Leith.

THE medical officer of health is indirectly concerned about the Insurance Act. When it comes into operation, and when the health committees are appointed, he will know better where he stands: in the meantime it is difficult to conjecture how much administrative work the outside members of the new committees will control. If their sphere of usefulness is to be limited to the review of sick benefit the position will be clear, but if the whole sanitary work is to be criticised by the co-opted members, awkward situations may occur, because it will be some time before they can learn all that is to be learned.

Of real interest to the health official are the provisions under the Act relating to sanatorium benefit. Already many local authorities have established methods for meeting the requirements under the new Statute. It is evident, however, that the demands for beds will be greater than they have been, because sanatorium treatment will not only be in greater request but may even be demanded. The medical officer of health will be glad rather than annoyed, because a greater proportion of early cases will be submitted for treatment. His present difficulty is to deal with men and women who reach the open-air wards

in a state that offers poor opportunity for promising lasting benefit to the sufferers.

From Germany we are compelled to take many lessons, and in the employment of tuberculin we have yet much to learn from our Teutonic friends. Tuberculin has now come to be recognised not only as a reliable diagnostic, but also as a specific remedy. The war between the sanatorium advocate and his rival has little interest to the health officer, who has no axe to grind. There can be little question, however, than that within the next decade there will be a modification of sanatorium methods. Tuberculin intelligently administered by those who have practically studied its possibilities and limitations will relieve sanatoria to a great extent. During the past year we have reduced the residence of phthisis patients from months to weeks because tuberculin was employed as an accessory to fresh air methods. Six weeks' residence in the sanatorium enables us to send patients home under the stipulation that they will systematically and at stated times repair to the dispensary set apart for the purpose for the continued administration of tuberculin.

As far as we have gone the results have been not only good, but immeasurably better than under the old system of rest, feeding, and fresh air alone.

The opsonic index is not only none too reliable, but too tedious a process, the physical condition of the patient being a far better guide to tuberculin treatment. When the value of tuberculin administered in intensive doses, up to 1 c.c., is fully recognised, and when the time wasted in decrying the method is better employed in testing its efficacy surprising results will be collected.

Among school children suspected by the school medical officer to be suffering from pulmonary tuberculosis the test dose with Koch's T.O.A. in the form of K.T. will be found of very great value. Within the past few months we have been able, at our recently instituted tuberculin dispensary, to "spot" tuberculous children at a very early stage by means of the test dose.

By "getting at" these young patients we can confidently expect to secure good and lasting benefits. "Save the child and you save the nation" is an apt quotation that specially appeals in connection with the tuberculosis crusade.

Within recent years a great change has been gradually manifesting itself in the methods of dealing with scarlet fever. It is now a common practice to curtail the residence of patients to an appreciable degree. Desquamation is not now looked upon with fearsome dread; in fact patients are regularly discharged from scarlet fever wards at the expiry of five weeks. With the introduction of open-air principles the isolation wards are converted into health-giving resorts. Hot-house temperatures are things of the past, and the beneficial changes

wrought by residence in these well-ventilated wards become apparent in a very brief space of time. Not only are our patients sent home pictures of health, but the cost of administration is being reduced to an appreciable degree. Last year in Leith the saving in treating scarlet fever patients was £300.

This sum is being further increased by the treatment of a greater percentage of cases of scarlet fever in their own homes. All over the country the so-called Milne treatment is being severely tested. It cannot claim to have created favourable opinions among hospital authorities. It has certainly enabled medical men to treat many cases "at home" instead of sending them to hospital.

No one has been able to fully explain the rationale of the system; many have derided it, yet in practice it fulfils all expectations, if the non spread of infection be taken as the criterion. This may, however, only go to prove what many already believe, that the danger of spreading infection from scarlet fever is not only slight, but is chiefly confined to personal and intimate contact with the sufferer. Within the past six months the percentage of removals of scarlet fever patients to hospital in Leith has dropped from between 70 and 80 per cent. to 65 per cent. The incidence of the disease has been smaller than usual, and the "return" cases among those treated at home no greater than usually found at ordinary times.

NEW BOOKS.

Applied Anatomy of the Lungs and Pleural Membranes, with Special Reference to the Apical Region of the Chest. By J. STUART DICKEY, M.D., B.Ch. Pp. 128. Illustrated by 50 Figures. Belfast: Alexander Mayne & Boyd. 1911. Price 5s. net.

THIS work gives a full description of the anatomy of the lungs and pleural membranes, and the author is not afraid to deviate from the usual accounts where they do not coincide with his own views. Particular attention has been paid to the surface and deep relations of the apical region, and from numerous dissections, which are figured and carefully described, the author comes to the conclusion that the upper limit of the apex does not reach the neck of the first rib. These conclusions are scarcely likely to be accepted generally, and it is unfortunate that in one of the illustrations (Fig. 29) the apex should fall short of the neck of the second rib—a very rare condition. Applied anatomy, both medical and surgical, is interspersed throughout the work and adds greatly to its value. Those who are interested in diseases of the chest will find many applications of anatomical facts which cannot fail to be highly instructive.

Microbiology for Agricultural and Domestic Science Students. By various Writers, and Edited by CHAS. E. MARSHALL, Professor of Bacteriology, Michigan Agricultural College. Pp. 724. 128 Illustrations. London: J. & A. Churchill. 1912. Price 10s. 6d. net.

THIS book can scarcely be called suitable for the medical man, for medical bacteriology forms but a small portion of it, and the information thereon, good as far as it goes, is frequently scanty and incomplete.

The numerous chapters, each by a recognised master of his subject, devoted to agricultural and technical bacteriology and mycology, are very well done and abreast of recent work.

Therefore to those for whom the book is chiefly intended, namely, students and workers in scientific agriculture, brewing, cheesemaking, vinegar-making, and other industries in which micro-organisms play an important part, it may be strongly recommended.

No such comprehensive text-book on non-medical microbiology and its applications has hitherto appeared in English.

The Law Relating to Medical Practitioners and Dentists in Great Britain. By J. N. MORTON, M.A., Solicitor. Edinburgh: William Green & Sons. 1912. Price 7s. 6d. net.

THIS small work presents in plain language a clear exposition of the law as it relates to medical men and dentists, and the decisions and opinions on which the author bases his statements are freely cited. A study of its pages reveals the narrow path a medical man must daily tread to keep within the strict limits of the law, but it also shows the protection he receives from the written law and the judges of the land, so long as he performs his duties honestly and conscientiously.

The appendix contains the text of the Medical Act of 1858 and the subsequent amending Acts, the Anatomy Act, and the Dentists Act. We would bring this work to the notice of every young practitioner.

The Mechanical Factors of Digestion. By WALTER B. CANNON, A.M., M.D. Pp. 227. Illustrated. London: Edward Arnold. 1911. Price 10s. 6d.

The Mechanical Factors of Digestion forms one of the series of International Medical Monographs published under the general editorship of Drs. Leonard Hill and William Bulloch. The volume is based upon the well-known work of Cannon and his collaborators published from the Physiological Laboratory of Harvard University, but contains in addition a good account of the related work of other investigators. Much has been revealed in the last ten years by the X-ray work on

the mechanical activities of the alimentary canal, and the author is to be congratulated as a pioneer in this field of investigation, the clinical importance of which is now so fully recognised. Pleasantly written and well illustrated, the monograph will be read with pleasure by all who are interested in the physiology and pathology of the alimentary canal. Much of the work has, of course, been already published in original papers, but the present volume makes it easy of access to the practitioner. A good deal that is fresh will be found in the chapters on the intrinsic and the extrinsic innervation of the gastro-intestinal tract. The monograph can with confidence be recommended to the profession as well worthy of study.

Lippincott's New Medical Dictionary. Illustrated. Edited by H. W. CATTELL, A.M., M.D. Pp. 1108. Philadelphia and London: J. B. Lippincott Co. 1911. Price 21s. net.

THIS new dictionary aims at supplying the medical student, practitioner, or laboratory worker with a compact guide to the understanding of the technical terms he may encounter. Its compass, however, is beyond that of a mere vocabulary, for much of its information is descriptive and encyclopædic in character. A general examination of the volume gives the impression of careful and accurate compilation. Although some of the small woodcuts showing microscopic sections and structures might be improved, the illustrations add much to the value of the text.

NEW EDITION.

Diseases of the Nose, Throat, and Ear. By WILLIAM LINCOLN BALLENGER, M.D. Third Edition. Pp. 983. With 528 Illustrations (including 22 Plates). London: Henry Kimpton. 1911. Price 28s.

THIS book has met with great success. The first edition was exhausted in a year, and the second, a still larger one, in the same length of time. The present edition has been closely revised and brought up to date; in fact some of the subjects which have recently attracted attention, such as the surgery of the labyrinth, receive almost undue notice. Dr. Chevalier Jackson has revised the section on bronchoscopy. Throughout the book the author does not hesitate to express his personal opinions—for instance he considers the nasal accessory sinuses to be residual organs. It can be frankly stated that the book is rather unequal—parts of it are excellent: on the other hand the pathology is sometimes at fault (nasal polypi are described as tumours), and the Latin of the book is by no means beyond reproach. The illustrations,

however, are good. In the part of the book which deals with diseases of the accessory sinuses the author lays great stress upon what he calls the "vicious circle of the nose." This circle does not consist of a series of pathological conditions, the one depending on and also keeping up the others, but of an actual circle, with its centre at the ethmoidal bulla and its circumference embracing the ostia of the frontal, maxillary, and ethmoidal sinuses. This section also contains an account of a somewhat dangerous method devised by the author by which the lateral mass of the ethmoid is cleared out in one piece; this operation he advises in cases of hay fever.

Sluder's operation for the enucleation of the tonsils with the guillotine is well described and illustrated, but the diagram on page 391, showing the anatomy of the faucial tonsils, is not correct. The author apparently has not recognised the fact that the supratonsillar fossa is included within the capsule of the tonsil.

Recent work on the functional examination of the ear is very fully described, but the section is not always clear or accurate, and the chapter upon the intra-cranial complications of suppurative otitis media might well be extended at the expense of less important subjects.

Though a considerable amount of revision is necessary before the 4th edition appears, the book is well worth reading.

BOOKS RECEIVED.

A HANDBOOK of Practical Treatment. Edited by J. MUSSER and A. O. J. KELLY

- (Saunders Co.) —
- DA COSTA, J. C., JR. Physical Diagnosis. Second Edition (Saunders Co.) —
- DENSILOW, L. N. A Surgical Treatment of Locomotor Ataxia. (Baillière, Tindall & Cox) 3s. 6d.
- FRANZ, S. J. Handbook of Mental Examination Methods
(Journal of Nervous and Mental Disease Publishing Co., New York) —
- GUTHRIE, C. L. Blood-Vessel Surgery and its Applications (Edward Arnold) 14s.
- HILL, LEONARD. Caisson Sickness and the Physiology of Work in Compressed Air
(Edward Arnold) 10s. 6d.
- HILL, WM. On Gastroscopy and Esophago-Gastroscopy (John Bale, Sons & Danielsson, Ltd.) 3s. 6d.
- KINDBORG, ERICH. Theorie u. Praxis der Inneren Medizin (Karger, Berlin) 20 mk.
- LEVISOHN, G. Die Entstehung der Kurzsichtigkeit (Karger, Berlin) 2 mk. 50 pf.
- MARK, L. P. Acromegaly—A Personal Experience (Baillière, Tindall & Cox) 7s. 6d.
- MIDDLEWEEK, F. F. Medical Gymnastics and Massage for the Treatment of Disease,
Deformity, and Injury (John Bale, Sons & Danielsson, Ltd.) 2s. 6d.
- MINCHIN, W. C. The Treatment, Prevention, and Cure of Tuberculosis and Lupus with
Allyl Sulphide (Baillière, Tindall & Cox) 3s. 6d.
- PALMER, MARGT. D. Lessons on Massage. Fourth Edition (Baillière, Tindall & Cox) 7s. 6d.
- SHAMBERG, J. F. Diseases of the Skin and the Eruptive Fevers. Second Edition
(Saunders Co.) —
- STUDIES in Psychiatry by Members of the New York Psychiatric Society
(Journal of Nervous and Mental Disease Publishing Co., New York) —
- THRESH, J. C. A Simple Method of Water Analysis. Seventh Edition (Churchill) 2s. 6d.
- TODD, J. C. Clinical Diagnosis—A Manual of Laboratory Methods. Second Edition
(Saunders Co.) 10s. 6d.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

The Scottish Medical Parliament.

THE recent meeting for the formation of a Scottish Medical Insurance Council is an event of considerable importance, not only with reference to this particular crisis in politics, but also to the solidarity of the profession in Scotland. By the necessity of his work the medical man is individualist: upon his own hand and brain and *savoir faire* he depends for success: hence if success come at all, it is because of those qualities which make for individualism. But the times are changed, and even those of us who would play the game single-handed must now change with the times and combine. The "solidarity of labour" is an old battle-cry; intellect must find its solidarity too, or perish.

The newly-formed Scottish Medical Insurance Council bids fair to give us what is a prime necessity at this time—a rallying point where our position may be defended, a spear-head wherewith our attack may be delivered. We live in democratic times, and a first necessity of any political fighting unit is that it be thoroughly democratic, truly representative of all ranks and grades. That the new Council fulfils this condition is quite certain. If the medical men of Scotland desire to have an instrument through which their wishes may be made known either to the Government or to the general public, here it is. Every insurance area has its representative, every branch of the British Medical Association, every corporate body in the Scottish medical world is represented here. Scotland as a political area lends itself well to the formation of such a body; it is neither so small as to be inconsiderable nor so large as to be unwieldy. It may be said that in the Scottish Committee of the British Medical Association we have a body which might well "voice" the opinion of medical Scotland; but when that voice speaks with the authority of London it has an English accent, it lacks the touch of the Doric: every Scotsman does best "what his ain de'il bids him."

So far the Council is holding, and only has powers to hold, a watching brief over the administration of the Insurance Act, but who knows what the future may have in store? Call it federation, devolution, what you will, some form of self-government may be on the way for Scotland, and in such a contingency this Council might aptly be vested with much more extensive powers; it might become in truth a Scottish Medical Parliament. In any case it has come to stay, and if properly made use of by the medical men of Scotland it should be a powerful instrument for their advantage.

The Insurance Commissioners at Work.

It is with no desire to increase the difficulties of the Insurance Commissioners or to stir up bad feeling between them and the medical profession that we draw the attention of our readers to the means recently adopted by certain members of the Scottish Commission to obtain information regarding the conditions of medical practice from individual practitioners.

The information which reaches us is to the effect that certain selected members of the profession have received from one of the Scottish Commissioners a letter, written on official notepaper, but signed by the individual Commissioner, asking for particulars of his working-class, private and club practice, "as per enclosed schedule," for the assistance of the Commissioners. The schedule included some ten questions, the majority of which referred to private practice and inquired into such matters as the total number of visits paid, the remuneration obtained therefor, the amount of work done gratuitously, the proportion of bad debts, and any circumstances likely in his opinion to increase or diminish the work, etc. Similar inquiries have been made by another Commissioner by telephone, and to save the practitioner trouble the assistance of a "doctor from London" to investigate his books was volunteered.

We are not for the moment concerned with the question as to whether or not the Commissioners are entitled to receive such information; our complaint is that individual members of the Commission should attempt to inveigle isolated practitioners to supply data which may be taken to represent the state of matters throughout the profession. The Commissioners concerned in this matter know that the medical profession in Scotland has decided to act together and has entrusted its interests to a representative body, the Scottish Medical Insurance Committee—or, as we have ventured to call it, the Scottish Medical Parliament—and ordinary considerations of tact, not to say good taste and straightforward dealing, should have prompted them to apply as a Commission directly to that body for any information they might desire. Even if we admit that the remuneration received for work done and the bad debts incurred are legitimate matters for inquiry, a doctor's charitable actions, like those of any other member of the community, are his private concern, and to pry into them seems to us in the very worst taste. Nor do we stop to consider the use to which it was intended that such information should be put. It is only right to say that any reply received was to be considered as "private and confidential," but if so, we are at a loss to understand how it could "assist the Commissioners." It seems abundantly evident that any statistics bearing on the questions contained in the schedule could only have value for actuarial purposes if carefully compiled on a definite and uniform basis from a large number of practices, and that data collected from isolated sources could only be misleading.

It must be admitted that the curiosity of the Commissioners

regarding the debit side of the doctor's accounts has raised certain suspicions, and we think not without reason. What the doctors of the country have been able to subsist upon under a voluntary system of practice cannot be accepted as a basis for calculating what they must be content with under a compulsory system such as is imposed by the Insurance Act. If the medical profession is to take any part in administering the Act the remuneration must be fair and equitable and in proportion to the demands made upon it. This is all we ask, and we will be content with nothing less.

We do not at present propose to argue whether the medical profession should or should not furnish the Commissioners with such information as is asked for in the schedule. When the proper time arrives this matter will doubtless be considered by the Scottish Medical Insurance Committee, and we are confident that that body will decide the question wisely. We take it, however, that one condition antecedent to supplying such information will be that the use to which it is to be put shall be disclosed, and that if and when the information is given it will not be used for other purposes.

**Report of the
Royal Commission on
Vivisection.**

THE final Report of the Royal Commission on Vivisection will afford no gratification to the opponents of experimental medicine. The Commission was appointed in 1906, and has held more than seventy meetings, at which representatives of Government departments, of scientific bodies interested in research, and of anti-vivisection and humanitarian societies have given evidence. After an exhaustive inquiry the only alterations of the existing regulations which are recommended are an increased inspectorate, further limitation in the use of curare, stricter provisions as to "pithing," additional restrictions regulating the painless destruction of animals which show signs of suffering after experiment, change in the constitution of the advisory body to the Home Secretary, and special records by experimenters in certain cases. The report is unanimous: all the Commissioners sign it, though Colonel Lockwood, Sir W. Collins, and Dr. G. Wilson do so subject to reservations, to which we shall again refer. Taken as a whole, the Report is, in the fullest sense, a justification of vivisection as carried on under the existing law. The implied conclusion is one which most of our profession will unreservedly accept, realising, as they must, how every year animal experimentation is coming more closely into touch with everyday practice in the diagnosis, prevention, and treatment of disease. Not the arguments of supporters, therefore, but the criticisms of avowed enemies, form the most interesting chapter in the story of the Commission. The leading critic of the Act is, of course, Mr. Stephen Coleridge, who formulated twelve charges against the Home Office administration. Nine of these the Commission find to be unjustified or unsupported by evidence; of the

other three, one refers to special leave granted to Sir Victor Horsley (but never taken advantage of) to inoculate monkeys in an unregistered place—the house of a patient suffering from *filaria*; one to the absence of inquiry by the Home Office as to the humanity of licensees; and one to the acceptance by the Home Secretary of advice from the Society for the Advancement of Medicine by Research. Only as regards the last do the Commissioners admit Mr. Coleridge's objections as valid, and they recommend that the present practice be discontinued and that the advisers of the Secretary of State be drawn from a list of names submitted by the Royal Society and the Royal Colleges. There could scarcely be better proof of the care with which the Act is administered than the complete breakdown in every material particular of these charges, the barren fruit of a ten years' investigation conducted by an acute and indefatigable critic supported by ample funds. A witness for the prosecution becomes, *volens volens*, a witness for the defence. The conscientiousness with which licensees in general have obeyed the law is still more apparent when we learn that since 1876 only four licences have been withdrawn for grave faults; while during the same thirty years there came under the notice of the Home Secretary only some sixty trivial or technical breaches of the Act, mostly due to inadvertence, and nearly always disclosed by the licensees themselves. A more notorious though less weighty critic than Mr. Coleridge was Miss Lind-af-Hageby, author of *The Shambles of Science*, a description of personal experiences, which, however, may be more correctly called impressions than records of fact. She, the Commissioners found, misapprehended what she saw, and mistook the symptoms of partial recovery from hibernation for paraplegia due to division of the cord. And it is the same with the other witnesses quoted—Colonel Laurie mistaken as to doses of morphia used; Mr. Graham in error as to Sir Lauder Brunton's experiments on hyperpyrexia. Dr. Crile's experiments on shock created considerable stir at the time; this was largely owing to his use of the word "incomplete" where "light" anæsthesia was intended. While it is fair to state that there was difference of opinion among the medical witnesses as to the justifiability of these experiments, it seems certainly proved that they were unattended by pain. Other experiments to which serious exception was taken were those which Professor Schäfer was authorised to do on dogs without anæsthetics in his research on resuscitation of the drowned. All that they amounted to, however, was the drowning of two dogs, who suffered no more pain than stray dogs that are destroyed in the same way. Such in brief are the arguments against vivisection, which are important enough to be embodied in this final Report. Against them are placed the beneficent progress of surgery and our increasing knowledge of and power of controlling the acute infectious diseases. Can any reasonable man or woman doubt the justice of the Commissioners' conclusions?

THE LOCAL SPECIFIC TREATMENT OF INFECTIONS,
WITH ESPECIAL REFERENCE TO EPIDEMIC
MENINGITIS.*

By SIMON FLEXNER, M.D.,

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New York.

Introduction.—More than five years have now passed since the antimeningitis serum was first employed. The production of the serum arose out of the tragic pandemic of epidemic meningitis of 1904-9. First, apparently, Northern Germany and Eastern America were severely visited, and later Europe generally and the continent of North America and the distant countries of Australia, India, South Africa, South America, Greece, and Syria. Whether still remoter regions were not swept into the epidemic I cannot say. The number of persons attacked is left entirely to conjecture, but that it must have been very great is shown by such imperfect records as are at present available. In Greater New York City alone not less than 5000 victims occurred in the winter of 1904 and spring of 1905, but the epidemic continued fitfully to ravage Europe and America until 1910. In America the disease has been quiescent, although it has not wholly disappeared, since 1909, and at the moment an active focus of several hundred cases at least is prevailing in Central Texas. The fatality has not fluctuated greatly. It rose in some districts to 90 per cent. and fell in others to 60 per cent.; the average has been about 75 per cent. In every respect, therefore, the epidemic has been severe. There was no acknowledged method of treatment prior to the introduction of the serum; now the serum treatment is being universally admitted to be of high efficiency.

Immunology had so far progressed that the production of an antiserum for the meningococcus may be viewed as a logical necessity. It was predictable that a serum potent in animals, in which infection can be controlled, could be prepared. Similar sera have been prepared for a whole host of infectious bacteria. None of these have, however, established themselves as of therapeutic value in the treatment of the spontaneous bacterial infections in man. I am, of course, not considering the bacterial

* The Cameron Prize Lecture of the University of Edinburgh, delivered on 4th March 1912.

intoxications, such as diphtheria and tetanus or lockjaw, but merely such infections as typhoid fever, pneumonia, and the pyococcal (pus producing) infections generally. Hence the quest for an effective antimeningitis serum was a journey beset with many misgivings. And thus it happened that in Germany Kolle and Wassermann and Jochmann each produced, by somewhat different methods, an antimeningococcic serum which they proposed to employ and actually did employ in different ways in the treatment of epidemic meningitis. The former proposed to inoculate it subcutaneously, the latter both under the skin and into the membranes about the brain and spinal cord by lumbar puncture. The empirical nature of these recommendations and the original inconclusive results created little confidence in the treatment.

The publications in Germany and my own first one on the same subject in America appeared within a few weeks of each other. We had been engaged at the Rockefeller Institute from the spring of 1905 in studying the *diplococcus intracellularis*. It early became evident that small animals—mice and guinea-pigs—could be protected against the meningococcus by means of an immune serum, but the conditions in them were very unlike those occurring in epidemic meningitis in man. Were it possible to simulate the spontaneous disease more closely an actual test of the serum might be carried out. Such a test was actually made possible by the setting up of meningitis in monkeys by direct subdural inoculation of virulent cultures of the meningococcus. The infective inflammation produced resembled the human affection closely, except that it was often more severe. The inoculations caused severe illness in a few hours and death in from 18 to 72 hours. The meningococci in part disintegrated, in part multiplied, and they distributed themselves, as in human cases, between the fluid exudate and the leucocytes or phagocytes. At the height of the infection a blood invasion occurred. The rapidly fatal instances resembled the fulminant cases among human beings, the other the human cases of average severity. It developed that both could be prevented or cured by injections of the antimeningitis serum.

To achieve this result certain definite conditions needed to be fulfilled. The manner of preparing the serum proved of importance. The first therapeutic experiments, carried out in December 1905, were unsuccessful, because, apparently, the goat's serum employed was itself not wholly indifferent. In order to remove all secondary factors large rhesus monkeys were immunised. With this homo-

logous serum immediate success was secured, but it was necessary to inject the immune serum directly into the infected and inflamed membranes. It is known that the meninges are highly impermeable to extraneous substances and even to the normal protein and other constituents of the blood; it was therefore improbable that so complex and altogether non-diffusible substances as the bactericidal antibodies could pass this membranous barrier. Besides, studies on the biology of the meningococcus had revealed that not only does it survive with difficulty when cultivated artificially, but that it is sensitive to osmotic conditions of the surrounding medium and succumbs to a high serum concentration. Then it was known that the diplococci which are ingested by leucocytes tend to die and undergo dissolution, and it was found that when acted upon by the antiserum not only did phagocytosis proceed more completely, but the ingested micro-organisms were more rapidly dissolved. The dissolution of the diplococci in cultures outside the body takes place through a process of autolysis, and the recent autolytic products are themselves poisonous. In the rapid development of severe symptoms, after subdural inoculation of virulent cultures in monkeys, the toxic elements in the autolysate play a large part. Since these effects can be prevented or set aside by the serum injections it follows that the serum possesses a certain power of neutralising the toxic contents of the diplococci provided it can reach their source and situation.

The conditions surrounding the entrance of chemical substances into the subarachnoid spaces from the general blood and lymph made it highly improbable that the serum could be brought into relation with the seat of infection by the usual methods of injection, hence the serum was injected directly into the meninges by means of lumbar puncture. In this way the several activities of the serum could be best secured. The concentration in the cerebro-spinal liquid could be regulated so as to exert the optimum of direct bactericidal effect, the opsonising value could be fully utilised, and the toxin neutralising power obtained at the highest value. The experiments upon monkeys verified these theoretical considerations. When the serum is injected into the membranes by lumbar puncture within a given period of time after the inoculation of the culture, in suitable amount and as often as the conditions require, the infected animals recover; when the serum is injected into the subcutaneous tissue or blood they succumb. The direct injection of the serum arrests the inflammatory process and causes a rapid return of the turbid or purulent cerebro-spinal liquid to a limpid state. Recovery is complete.

An immune serum prepared in the horse by alternate injections of a recent autolysate, prepared from the meningococci and dead and living cultures, developed properties similar to those present in the immune serum produced in monkeys, and it acted upon the experimental infection in monkeys in all essential respects similar to the homologous serum. The next step was to test the efficient immune serum from the horse upon human cases of epidemic meningitis.

The opportunity to make a practical test of the antimeningitis serum on cases of epidemic meningitis came in the spring of 1907. The general epidemic had subsided over the United States, although sporadic cases were still appearing. An outbreak of the disease occurred in Ohio and covered a territory of several hundred miles. It involved sparsely settled country districts and small cities and towns. The mortality at the time of first employing the serum approached 90 per cent. The effect was immediate and almost magical. The mortality at once fell below 25 per cent., and among certain small groups of cases to 10 per cent. The doses of serum employed were smaller than are now recommended, and the repetitions were carried out with less system than now. It seemed impossible that any other factor than specific action could account for the change described, but the test was not, of course, decisive. During the winter of 1908-09 the disease was very prevalent over Western United States, and the serum was widely, if not universally, resorted to. In general the results were highly encouraging, but there were, of course, individual failures.

It was concluded to extend the area of its trial as widely as possible, and hence the serum was placed by the Rockefeller Institute at the disposal of hospitals over the accessible parts of the world. The first serum sent out of America was to Great Britain—to Dr. Robb of Belfast and Dr. Ker of Edinburgh. The gentlemen displayed from the beginning a zeal and perspicacity in its application that I greatly esteem and that have put me under lasting obligations. Many other countries drew upon the supply—France, Belgium, Switzerland, Denmark, Germany, Africa, India, Australia, South America, as well as Palestine and Greece. The consensus of experience, and thus of opinion, of its usefulness is to-day clear and, as I believe, unimpeachable. What I shall present to you to-day as evidence of its value is based upon a study and analysis of the histories and briefer reports of cases of epidemic meningitis treated in many countries and by many physicians. The number of cases studied and analysed is

1300. The reports are not all of equal value. The results in all hands have not been equally good. Speaking generally, where one person or hospital has been called upon to use the serum upon a fair or large number of patients the experience gained is usually reflected in the results, which are likely to be better than in institutions in which very few cases have come under treatment. Not a few institutions failed to return reports. I have no reason for supposing that they were very different from the many returned. The cases have not been selected except in so far as care was exercised to include in the analysis only those of epidemic meningitis and to exclude such as were treated when in a dying condition and survived the injection merely a few hours. We are indebted to many physicians and hospitals in near and distant parts for the part they have so zealously taken in the investigation that has now securely placed the antimeningitis serum on a substantial basis of approved value. I am happy to testify that the employment during this period of other preparations of the serum in countries in which it has come to be produced has been attended with comparable results. The serum next most frequently used, especially in Germany, is that prepared at the Institute for Infectious Diseases in Berlin, and bears the name of Kolle and Wassermann. Levy of Essen has reported upon its administration in 165 cases of which the mortality was less than 20 per cent. Jochmann's serum, prepared by the chemist Merck, has been, apparently, far less employed. The more recent product of the Pasteur Institute obtained considerable application during the recent French epidemic of meningitis, and Dopter has collected 402 cases treated with it that show less than 20 per cent. mortality. Meagre reports have thus far come from Austria, where the serum prepared in Paltauf's Institute is available.

Analysis of 1300 Serum-Treated Cases.—We can consider this subject of serum treatment from several points of view, namely, the mortality, duration of illness, manner of termination, sequels, and still other. This it is proposed to do in a brief manner consistent with the limits of an address. It will not be profitable, I think, to discuss individual cases so treated. Epidemic meningitis is a highly protean disease of which the cases present wide variations of clinical character ranging from the gravest to such degrees of mildness as to make them difficult of detection. And yet the affection tends to a fatal issue, either quickly during the height of the acute attack or gradually after it has become chronic. When recovery occurs the symptoms as

a rule gradually ameliorate, and yet in rare instances they cease abruptly by a sharp change in the condition that merits the name of crisis. Spontaneous recovery may be complete even after the symptoms have endured for several months, but yet serious sequels may remain, among which are deafness, blindness, paralysis, and impaired mentality. In casting up, therefore, the results upon which may be based a deduction of the value and importance of the treatment, account should properly be taken of the history of large series of serum-treated cases. In this way the natural course of the disease may be contrasted with the artificial, caused by its premature interruption by means of a wilful process of passive immunisation. Any analysis must begin with a consideration of the effect on the gross mortality. It may be taken as a fair statement of fact that at no place or time during the pandemic did the ascertainable mortality fall below 60 per cent., and it tended to be much higher and to fluctuate between 70 and 90 per cent. There is little difficulty in obtaining fair mean figures for localities where many cases arose, and great difficulty where the cases were few, scattered, and sporadic in character. In the former instance it has usually been possible to secure comparable figures relating to non-serum-treated and serum-treated cases occurring simultaneously.

There have been subjected to analysis 1295 serum-treated cases of proven epidemic meningitis, of which 893 recovered and 402 died, or, as expressed in percentages, the recoveries were 70 and the deaths 30 per hundred. These figures include patients of all ages, from infants a few weeks old to adults, and cases treated promptly or within the first few days of illness and others treated as late as several weeks or months after the onset. Hence it becomes necessary to inquire more precisely into such details as the effects of the period of treatment and of the age of the patients upon the results.

The histories of 1211 patients were sufficiently detailed to enable us to determine the period of the disease at which the serum treatment was instituted. They are divided as follows:—199 cases were injected within the first three days of illness—the mortality was 18 per cent.; 346 were injected from the fourth to the seventh day of illness—the mortality was 27 per cent.; and 666 were injected later than the seventh day of illness—the mortality was 36 per cent. I view this result as significant, for in spite of the uncertainties surrounding the period of onset of the symptoms which affect the accuracy of the calculation, the

beneficial influence of early injection is undeniable. The first two periods are fairly homogeneous, while the last period is made up of cases not a few of which were in a semi-chronic or chronic condition, and thus in the main quite hopeless. I think it important to consider this fact, because I am convinced that many more cases of epidemic meningitis in the first, second, and third weeks of the disease can be saved than this calculation indicates. The unpromising examples are the chronic ones, especially among infants, and the afebrile ones among older children and adults.

It has been commonly observed that infants under one year old or between one and two years of age possess very little resistance to epidemic meningitis. The mortality among them has risen frequently to 100 and has fallen rarely below 90 per cent. It will be instructive, therefore, to inspect the figures of serum-treated cases among these tender patients. I found that the histories of 125 infants below one year of age were given in such detail as to enable me to determine the effects of the serum according as it was employed in the different time periods described. The total number, therefore, subject to analysis is 125, of which 63 cases recovered and 62 died. The next figures are highly significant. There were five infants injected within the first three days of illness; all recovered. There were 16 infants injected within the first seven days of illness; 12 recovered. Throwing these two sets of figures together, because of the small numbers, we have 21 cases with 17 recoveries and 4 deaths, or a fatality of less than 20 per cent. On the other hand there were 104 cases which came under the treatment at some period later than the seventh day, among which 46 recovered. The mortality in this group, while still far below that of the spontaneous fatality rate, is nevertheless 56 per cent. The results among infants ranging in age from 1 to 2 years are still better. They need not, however, detain us. It would seem scarcely possible that so profound and systematic a change in the character of a notoriously mortal affection could be accounted for on any other grounds than that the method of treatment, with the employment of which the change coincides, is and must be responsible for it. The age period of two to five years among children appears, on the other hand, to be more favourable to recovery. Two hundred and one cases among this period are subject to analysis, of which 171 recovered, thus bringing the mortality rate to 15 per cent. This figure separates naturally into the two rates of 10 per cent.

among the children who were injected with the serum within the first week of illness and 20 per cent. among those injected later than the seventh day of illness. Finally, I wish to submit some data relating to adults who have come under the injections for which I have chosen the miscellaneous age period of 20 years and over. The cases analysed were 263, of which 160 recovered and 103 died. The death-rate is therefore 39 per hundred. This relatively high figure merits particular attention, since it is the most unfavourable of all to the action of the serum. It propounds this question: Are adults less subject to the serum or do they have a more highly mortal form of the infection?

A few facts are quite clear. Adults do furnish a higher number of so-called explosive or fulminant examples of meningitis than do children. They may endure merely a few hours or at most a day or two. Thus far very few of them have recovered under the serum injections, yet their occurrence is too infrequent to account for the disparity. It may prove to be the case that children can be more readily and surely saved than can adults by the treatment. It is significant, however, that wherever groups of adults and not single ones suffering with epidemic meningitis came under the serum treatment, as happened in Great Britain, France, America, Palestine, this discrepancy was not noted. Taking these group instances together the fatality does not exceed 25 per hundred. Apparently, then, experience in the employment of the serum counts for more in treating adults than in treating children, who show a greater spontaneous tendency to recovery. Young children, on the other hand, rarely succumb to the highly acute infection; they tend rather to succumb to chronic infection superinduced, often, by the dissociation of the spinal membranes and the ventricles of the brain.

It is obviously very important to contrast the fatality of the serum-treated cases with that of similar cases treated in other ways. In this way alone can a fair judgment be secured. Epidemics fluctuate—they tend to be severer at their height than when rising or falling, hence the comparison must be simultaneous. Fortunately we possess a number of such observations made in Great Britain and Ireland, France, America, and the Far East. They are fairly uniform. At none of these places did the average mortality fall below 70 per cent., and at none did that of the serum-treated cases exceed 25 per cent. The latest figures are particularly favourable. They come from France,

Palestine, and Texas in America, and they fall below 15 per hundred, and yet I must still believe that some other element may enter into the result. Dr. Ker of Edinburgh used the serum during the same period as that in which Dr. Robb employed it in Belfast, and while he obtained, on the whole, excellent results, they are nevertheless less favourable to its action than these last figures indicate.

Natural recovery in epidemic meningitis is usually by gradual and often by slow subsidence of the symptoms, of which certain ones, such as the contraction of the muscles of the back, persist after all others have disappeared. We were early impressed by the number of serum-treated cases that ceased abruptly and often with striking celerity by crisis. This mode of termination has since been noted and commented on favourably by many observers. It may be of interest, therefore, to examine this larger series of cases with reference to this point. First, it is desirable to obtain data upon the average duration of the active symptoms and effects of the disease. The histories of 774 of the cases either expressly stated or sufficed to show the period of their duration. It was approximately eleven days. This figure is, of course, still further divisible according to the length of duration of the gradually and of the abruptly terminating cases. The average length of the former was 14·3, and of the latter 5·7 days. The full meaning of these figures can be grasped when they are compared with the average duration of the disease in cases that recovered spontaneously in pre-serum days. This point was investigated by the New York Department of Health, who found it to be about four weeks.

The proportion of cases terminating in the two manners is also important. In a previous tabulation of 400 serum-treated cases we made out that about one-fourth, or 25 per cent., terminated by crisis. The larger tabulation now indicates that fully 30 per cent. so cease. I should not wish to insist too emphatically upon the approximate correctness of this calculation. It is obviously hazardous to work out data of this kind at one's desk and remote from the cases themselves, and I should not have presented the figures at all were it not that just this remarkable action of the serum has impressed the imaginations of those called upon to employ it.

The wards of a fever hospital in which many cases of epidemic meningitis are assembled presented only too recently a very tragic appearance. It mingled the severely acutely ill with the painful

chronically ill—persons wasted, deformed, blasted—who lingered for weary weeks and months until mercifully released by a too-long-delayed death. Now I am told that they bear a very different aspect. The severely ill and the dying, even though the numbers be fewer, are still there, but the hopeless chronic invalids are entirely absent or very seldom seen. This in itself is a gain from the serum difficult to overstate. It is because of it, and because, further, of the greatly shortened duration of the period of active illness, that many physicians became convinced of its efficacy before the numerical results justified the deduction. I have been told by Dr. Dunn that at the Children's Hospital in Boston the meningitic wards have become almost the most cheerful in the institution.

Epidemic meningitis, when not fatal, progresses towards spontaneous recovery not with a uniform course but attended with many fluctuations or remissions. These I should separate from relapses that appear after long periods of freedom from acute effects and symptoms. I am not aware of any statistics that indicate the frequency of relapses in the ordinary course of events, but I have undertaken to ascertain their frequency in the serum-treated cases. The records do not always cover this point, but among them there are good evidences of one or more relapses having occurred in 56 instances. Forty of these patients recovered and sixteen died. The interval between the cessation of active symptoms and the onset of the relapse is usually a few days or at most a week or two, yet undoubted relapse or recrudescence of the active symptoms, attended by a fresh appearance of meningococci in the cerebro-spinal liquid, have taken place after several months. An accidental blow upon the head has precipitated a long-delayed relapse. The few cases of this kind that have come under observation have responded to renewed injection of the serum.

The serum produces its beneficial effects by acting directly upon the meningococci, the multiplication of which it inhibits. I have already alluded to the property displayed by the serum when in a high state of concentration in arresting the growth of that micro-organism. The damage which is thus inflicted leads to dissolution by extracellular autolysis, but at the same time many of the diplococci are charged with opsonin and made more ingestible by phagocytes by which they again suffer an accelerated solution. Thus it is that the cerebro-spinal fluid quickly fails to yield cultures of the meningococcus, and even though

they may still be discovered by direct microscopical inspection. The meningococci that are reached by the serum are readily brought under control, but with some exceptions. The persistence or progression of the infection arises from the inaccessibility of the diplococci in thick exudate, in isolated parts of the membranes, or in the blocked-up cerebral ventricles. It is rare for the accessible meningococci to be capable of growth after the second or third serum injection, and not infrequently the first injection stops all multiplication as far as can be judged from studies of the fluid withdrawn by lumbar puncture. As the inflammatory exudate resolves and disintegrates the imprisoned diplococci are liberated and brought under the influence of the serum. In young children especially, in which the inflammatory exudate produces an obstruction at the base of the brain, dissociating the spinal membranes from the ventricles, the infection and inflammation may be overcome in the former while remaining active in the latter. The attempt has been made and already with several successful instances of withdrawing the infected fluid from the lateral ventricles and of replacing it with the serum. In infants with open fontanelle the needle is readily inserted into the ventricle; in older children and adults a trephine opening is made in the skull. The operation itself is apparently safe to perform. This method of application of the serum is made hopeful by reason of the chance it offers of suppressing infection in the cerebral ventricles, and because also it may be the means of re-establishing communication between the spinal membranes and cerebral ventricles, through which the dangers of a hydrocephalus are averted. One point is to be emphasised: the employment in this way of the serum should not be too long deferred.

The abolition of the meningococcus having been accomplished, the inflammation quickly subsides, and thus each succeeding lumbar puncture yields a less turbid cerebro-spinal fluid until the original limpidity is restored. The result is the same in cases favourably affected, no matter whether the inflamed membranes yielded at first merely an opalescent or a highly purulent fluid.

There is, unhappily, another side to this medal—not so bright. Not all strains of the meningococcus are so subject to the destructive action of the serum. We have now learned that certain strains resist the action of the serum and multiply in and in spite of it. When infection with such resistant or, as

they are also termed, serum-fast strains exists, far less can be hoped for from the treatment. Luckily the "fast" strains do not appear to be common; they are the exceptional ones causing epidemic meningitis. Their occurrence brings the meningococcus into conformity with other bacteria and many pathogenic protozoa that show a tendency to mutation in the direction of acquiring both "serum" and "chemical" fastness. It is not improbable that a more carefully and subtly prepared antiserum, made so as to represent these as well as the ordinary strains of the meningococcus, may overcome this small obstacle to its more successful use.

The number of permanent sequels among the serum-treated cases is small. Thus far deafness, either partial or complete, has been the one serious complication noted. Deafness occurs early in many cases and before the treatment is instituted, but it has appeared after the treatment has been begun. Blindness, paralysis, and impaired mentality have either not occurred at all or so rarely as to be negligible as factors. In estimating this aspect of the larger question account should be taken of the fact that about three times as many persons now recover from the disease as did formerly. It may therefore be stated that the recovery tends to be complete. The infection of the joints that complicate a certain small number of cases is relatively of simple and benign character. When treated by withdrawal of the contents and serum injection it is quickly arrested.

There are still other aspects of the subject of the serum treatment of meningitis that might be presented, but as they relate to somewhat more special points of the manner of treatment and the interpretation of more or less obscure or subtle phenomena they can well be omitted here. What I have aimed to do is to review in your presence what I consider the foundation on which rests at the moment this specific therapeutic venture. I shall wish to leave to your fair judgment the ultimate decision whether or not the presentation is substantial and convincing. I have myself arrived at a conclusion which I shall lay before you: The antimeningitis serum, when used by the subdural method of injection, is capable of reducing the period of illness, of presenting in large measure the chronic lesions and types of the infection, of bringing about complete restoration of health in all but a very small number of the recovered, and of greatly diminishing the fatalities due to the disease.

I desire now briefly to present a few data, the purpose of which is to show that the method of local specific treatment employed successfully in epidemic meningitis is perhaps capable of wider application. There are not a few infectious processes of essentially local nature to which curative principles, whether native to the blood, or chemicals, or immune sera introduced into it from without, gain access very imperfectly, for the reason that they pass with difficulty into the lymph, or because the infectious lesion is not accessible to the lymph which contains them. Should these lesions be subject to direct introduction of the serum by injection they might prove more subject to control. Lesions of such essential local nature are represented by infections of the serous membranes, that receive normally a dilute and modified lymph secretion by massive inflammations, as in lobar pneumonia and abscess-formation, syphilitic gummata, tuberculous foci, and others that suggest themselves. For the purposes of illustration I have chosen several kinds of experimental infection of the meninges, in which local treatment has been applied, to lay before you.

Influenzal meningitis in man is a highly fatal inflammation. It occurs especially among children, and is attended by an influenza bacillus septicæmia. The subdural injection of virulent cultures of influenza bacillus into monkeys produces a corresponding condition, which can be abated by local treatment with an anti-influenzal serum. Artificially produced, pneumococcus meningitis in monkeys is a highly fatal infection also. It cannot be controlled by anti-pneumococcus serum alone, while it is subject to the local injection of a mixture of anti-pneumococcus serum and a lytic chemical such as sodium oleate. Neither acts alone, but in combination they exert a destructive effect upon the multiplying pneumococci provided they are brought into immediate relationship with the seat of disease, as can be done by means of intradural injection. In carrying out the method it is necessary to keep the soap apart from the serum protein, for which it possesses an affinity, and this is accomplished through the addition of a minute quantity of boric acid. This chemical does not prevent the soap from acting upon the pneumococci, for which it has a still higher affinity.

Both in the influenzal and the pneumococcus meningeal inflammations a blood invasion with the bacteria occurs. This can be suppressed by the local mode of treatment, through which, first, the eruption of the bacteria into the blood is stopped and, second, the bacteria already in the blood are brought under the influence

of the specific antisera which pass readily from the meninges into the blood. But neither the meningeal infections nor the attendant bacteræmia can be controlled and the fatal issue averted by injection of the curative agents directly or indirectly into the blood.

Still other instances might be cited as examples of the efficacy of the method of specific local therapy of infections. I shall have accomplished my purpose if I have succeeded in interesting you in the principle that underlies the suggestion for any extension and, in some degree, improvement of our present therapeutic methods.

NOCTURNAL URINATION.

By A. G. MILLER, M.D., F.R.C.S.,

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MEN, somewhat advanced in life, frequently have to rise at night to pass water. Why is this? It is because they have residual urine in their bladders.

In August 1900 I published in the *Scottish Medical and Surgical Journal* a paper on "Residual Urine in Cases of Enlarged Prostate," in which I tried to demonstrate that the nocturnal incontinence (so-called) in old men was due to the presence in the bladder of residual urine, and to the irritation produced by the chemical changes that occur in it. I mentioned that my attention had been directed to the subject by the case of an old friend, a medical man, who had consulted me, and who had been benefited by a procedure which I recommended to him. His residual urine was decreased, he passed water in a more forcible stream, and he had to rise less frequently at night. In discussing his case with him the thought occurred to me, that if urine can be got to flow at all, why is the bladder not emptied?

In seeking an answer to this question one naturally thought of the fact that the patient is usually advanced in life, and therefore somewhat feeble. The man is physically past his best. Still, however feeble the man may be, surely he ought to be able to empty his bladder if he can pass water at all. Again, the presence of an enlarged prostate suggested obstruction as a cause. My experience, however, convinced me that that condition is not always present, neither is residual urine always the consequence of an enlarged prostate.

This led me to cast about for a more constant and likely explanation, and it occurred to me that a possible one was the

acquiring of a habit of not emptying the bladder. I tried to explain this by the suggestion that most men are usually in a hurry to get rid of their urine, and of the feeling of discomfort that a somewhat distended bladder causes.

My attention has naturally been directed to this matter during the past years, and I have not failed to notice the habits of my fellow-men in this respect, and I have had no difficulty in realising that men usually spend as little time as possible in "relieving nature"—"making themselves comfortable." They perhaps think that they are emptying their bladders, but they don't always do it. This becomes, in old men, a habit, and is increased by a well-known peculiarity of age, viz. that the aged are slower, as well as feebler, in their movements, and, therefore, they take longer to perform any and every action. Bearing this in mind it is easy to see how an old man naturally (if one may say so) gets into the habit of not emptying his bladder.

At this point let me refer to the physiology of the act of micturition. The act is twofold. Firstly, there is the relaxation of the muscles that close the bladder. Secondly, there is contraction of the bladder itself, aided by atmospheric pressure, and sometimes by the abdominal and pelvic muscles. These actions are partly voluntary and partly involuntary. Normal micturition requires little or no effort. When there is any obstruction, however, considerable effort may be necessary. Still, as I have said, if the flow be once started, why should it not go on till the bladder is completely emptied? My argument is that the man stops short in his effort whenever he has the sense of relief, and the result is that some urine is left in his bladder. It may not be much, but in the course of time he acquires a habit of incomplete urination, and residual urine, with its consequences, results.

It may be that spasm has sometimes to do with the difficulty that an old man has in passing water, especially in commencing the act. This may be treated in one or both of two ways. The spasm may be relieved by suitable drugs, or, on the other hand, it may be overcome by increasing the power and tone of the bladder. This latter should be obtained by the procedure that I recommend. I have also seen benefit from the administration of ergot, especially in cases in which there is the complication of a large, soft, and bleeding prostate.

I wish now to answer some of the questions that have been put to me by correspondents, and in conversation with medical friends and others.

In regard to the means to be adopted for training the bladder, and getting rid of the residual urine, I originally recommended that the patient should wait for a few minutes, after passing water in his usual manner, and then make a second and more forcible effort. I have been frequently asked, "How long?" I have no hesitation now in saying "Not too long." Half a minute, or even less, is long enough. A more correct and safer recommendation would be—"Make a short pause, and then try to get rid of some more urine." It is not necessary or advisable to make these special efforts during the night.

In a former paper I mentioned the case of an old physician who got rid of his residual urine—which was considerable—by concluding his act of micturition by, what he called, a series of squirts.

I have been asked whether passing water as frequently as possible would not do as well. Certainly not, *if it is desired to get rid of the necessity for rising at night*. No doubt the bladder might be trained thus to empty itself, and the residual urine diminished, or even got rid of, but the bladder would acquire and retain a tendency to act frequently, and to resent the presence in its cavity of more than a few ounces of urine. Now I take it that what the old man complains of is not the presence of residual urine, of which perhaps he is ignorant, but of his having to get up frequently at night. Retaining the urine a sufficient time—as long as possible—is, in my opinion, of almost as much importance as the training of the bladder to empty itself thoroughly.

Another question that I have been frequently asked is, "What about drinking?" My advice is, avoid all alcoholics, take as little tea and coffee as possible, but drink water, especially warm, freely. The best times to take the water are, in the morning, when a tumblerful may be indulged in, and half an hour before meals—say lunch and dinner—when half a tumbler may suffice. As to drinking water at bedtime, I cannot so confidently give advice, there is so much difference in people and their peculiarities. Some sleep better, and are less likely to be disturbed during the night if they take a tumbler of water immediately before going to bed. In their case the explanation probably is that a comparatively large quantity of limpid urine is less irritating to the bladder than a smaller quantity of concentrated urine would be. Others, again, are better if they drink no liquid of any kind after dinner. Again, there are some with whom a sort of compromise is best, viz. taking the water about an hour before going to bed. In this way perhaps a consider-

able amount of it is got rid of when urine is passed on retiring to rest.

I do not pin my faith to any one way of training the bladder to empty itself. Neither do I think that any one method will be the best for everybody. The "second effort" was what I recommended in 1900, and it was found to be useful to several others besides my first patient. The method by "squirts" may suit others better. A medical friend has reminded me of an old method—sitting on the water-closet. There is no doubt that in this position there is greater power in straining, but I do not think that straining is necessary in the class of cases about which and for which I am writing. Straining comes in advanced cases of prostatic enlargement, but in these the idea of training the bladder comes almost too late. Some unfortunates with enlarged prostates have to strain so much that they must sit on the water-closet every time they pass water, because the bowels are apt to act at the same time. It might be a good plan, however, in some cases, to pass water sitting on the water-closet the last thing before going to bed. In this way a thorough emptying of the bladder may be secured.

I wish, in conclusion, to make it clear that I am treating of *early cases* and of the *commencement* of the formation of residual urine. *Obsta principiis* is my motto. My last word of advice is—*take time, exercise patience, and insist on getting rid of the last drops.*

If any sufferers need encouragement, I can honestly say to them that several have benefited by my suggestions, and if others are encouraged to try and to persevere by what I have written, my object in writing this paper will be attained.

TREATMENT OF CONTRACTION OF PELVIC OUTLET— TWO CASES, ONE TREATED BY PUBIOTOMY, THE OTHER BY INDUCTION.*

By JAMES YOUNG, M.D., F.R.C.S.,

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I HAVE recently had under my care two cases of contraction of the pelvic outlet, each of which I believe exhibits some points of practical importance.

In this country contraction of the outlet has not received much attention. That it occupies an unimportant place in the

* Communicated to the Edinburgh Obstetrical Society, February 1912.

calculations of practical obstetricians is proved by the fact that it is absent or receives only a passing mention in the many discussions on the subject of pelvic contractions which have been held in recent years. The same is true of the text-books on midwifery. The treatment of contracted pelvis is almost invariably discussed in terms of the diameters of the inlet. That this neglect is unjustified is suggested by the statement of Whitridge Williams, based on a study of 2215 successive cases in which measurements were taken at full time, that in the United States the typical funnel pelvis constitutes 44 per cent. of all deformed pelvis in white women. This is a striking discovery. The same relationship, however, cannot apply in this country, in which rickets is the predominant cause of pelvic deformity, a deformity, from the obstetric standpoint, most marked at the brim, whilst in the United States only about 6 per cent. of pelvic abnormalities are due to rickets. The large number of funnel pelvis discovered by Williams¹ in his series, however, suggests the possibility of the absolute number being greater in this country than is ordinarily supposed. Within a few weeks I had two typical examples in my own practice.

If, as Williams suggests, the condition of funnel pelvis is due to a high assimilation, *i.e.* a fusion of the last lumbar and the first sacral vertebrae, the condition is brought into the category of a developmental deformity, a fact which increases the likelihood of its being independent of local influences, and supports the belief that the obstetric consideration it receives in this country is more meagre than its importance demands.

There are two distinct types of pelvis with contracted outlet. In the first the abnormality is superimposed on a condition of imperfect development, such as characterises the generally contracted or justo-minor pelvis. In the second—the typical funnel pelvis—the contraction is limited to the outlet, and would seem in the large number of cases to be associated with a high assimilation, which leads to a rotation of the innominate bones on a horizontal axis with an approximation of their lower ends. The typical funnel pelvis is present in 5.87 per cent. of white women, whilst the generally contracted funnel pelvis is only present in 9 per cent.² The cases which I shall relate belong to the former class.

The normal distance between the ischial tuberosities is 4 ins. (10 cm.). As the result of a study of his cases Whitridge Williams places the lower level of safety at 8 cm. ($3\frac{1}{4}$ ins.), but, as is well

known, the bisischial diameter may be reduced below this and yet a spontaneous delivery at term take place. This is possible either in the case of an unusually small child, or with an ordinary child it may occur in the event of the part of the pelvic outlet behind the transverse diameter being sufficiently large. In the present state of our knowledge we have no precise method of determining the size of the child, and the conditions forbid the employment of a method of discovering the relative sizes of head and maternal parts such as that of Müller for the case of the pelvic brim. It is clear that the only method available in the majority of cases, and it can be defined as only approximately scientific, consists in a measurement of the outlet behind the bisischial diameter. This should invariably be carried out in a suspicious case.

Special instruments have been devised for measuring the distance between the bisischial diameter and the tip of the sacrum, *i.e.* the posterior sagittal diameter, but it can be done with sufficient accuracy by placing the patient in the dorsal position at the edge of the bed with the legs drawn up, laying a pencil across the pelvic outlet at the level of the nearest points on the inner margins of the ischial tuberosities and with callipers marking off the interval between the centre of this line and the tip of the sacrum. One cm. subtracted from the measurement thus obtained gives the diameter available in the posterior part of the outlet.

With regard to the relation which must exist between the transverse and the posterior sagittal diameters before a spontaneous labour can be expected there is some difference of opinion. Klien,³ one of the first writers to formulate a scientific method of treatment of outlet contractions, states that with a transverse of 8 cm. a posterior sagittal diameter of 9 cm. is required, whilst Whitridge Williams places the latter figure at 7.5 cm. The latter author gives the following table of approximate measurements with which it is exceptional to get spontaneous labour:—

Bisischial Diameter.	Posterior Sagittal Diameter.
8.0 cm.	7.5 cm.
7.0 „	8.0 „
6.5 „	8.5 „
6.0 „	9.0 „
5.5 „	10.0 „

In the article from which this table is taken Whitridge Williams makes some interesting observations on the influence of posture upon the size of the outlet. Matthews Duncan, many

years ago (1854), referred to the enlargement of the antero-posterior diameter obtained by flexing the thighs on the abdomen, a result which may be considered as the converse of the increase in the conjugata vera, which Walcher thirty-five years later (1889) showed was produced by extending the legs on the pelvis. Since Walcher's discovery Matthews Duncan's observation has been rehabilitated by several workers. As Williams points out, the exaggerated lithotomy position cannot be maintained for any length of time unless an anæsthetic is given, and it is therefore not available in the majority of cases. This disadvantage is overcome by finding that a modified Sims' position, in which the legs are even more flexed than usual on the abdomen, gives equally good results.* Whilst he has not had enough of cases of funnel pelvis on which to dogmatise, Williams has convinced himself of the value of this procedure by a series of examinations carried out on normal women.

FIRST CASE.

Pubiotomy.—As far as I can make out this constitutes the second case of pubiotomy reported at the meetings of this Society. The first was recorded by Dr. Berry Hart in 1904. In that case the patient unfortunately died on the third day after the operation from chloroform poisoning. The operation was carried out in a patient with a narrowing of the brim, who had been delivered four years previously by craniotomy. The child was living.

The patient whose case I wish to record was sent to me by Dr. Gardner of Leith, to whom she had first entrusted herself for medical attention in this pregnancy. She was a strong woman of 28 years of age. There was no history or sign of rickets. The height was 4 ft. 11 ins.

She had had two children previously. The first went to full time, and was only delivered after craniotomy on 27th September 1908. The weight of the child was not noted. There is no information available as to the position. In view of the calamity just mentioned, induction of labour a month before full time was

* Williams states that "this observation is of very considerable practical importance, and that it emphasises in an unexpected manner the advantages of the exaggerated Sims' position for delivery. It not only brings about a degree of enlargement of the antero-posterior and posterior sagittal diameters sufficient to permit the spontaneous termination of labour, which would be impossible in the ordinary obstetrical position, but at the same time it should diminish the frequency of deep perineal tears by the same mechanism."

carried out in the second pregnancy. This child, however, was delivered on the 17th June 1910 after a very difficult and tedious forceps extraction, and lived only a few minutes. The forceps was applied because of the long delay of the head in the pelvis. The child was again not weighed. Dr. Gardner says that the head was born in an occipito-posterior position.

The pregnancy with which we are at present concerned was expected to reach full term about the 26th August 1911.

The measurements taken when I saw her are as follows:—

Interspinous diameter . . .	22 cm. (9 ins.).
Intercristal diameter . . .	28 cm. (11 ins.).
External conjugate . . .	19 cm. (7½ ins.).
Diagonal conjugate . . .	Promontory not reached with the finger.
Between tubera ischii . . .	8 cm. (3¼ ins.).
Antero-posterior diameter of out- let	11 cm. (4¼ ins.).
Posterior sagittal diameter . . .	6 cm. (2½ ins.).

In view of the previous history, and especially the failure of induction of labour in the last pregnancy at a comparatively early period, namely the 36th week, and, in addition, having regard to the pelvic measurements, it was concluded that the most reasonable chance of obtaining a living child on this occasion would be obtained by waiting till full time and then delivering by Cæsarean section or pubiotomy. The two alternatives were explained to the patient and her husband. Cæsarean section was refused. The patient said that if other measures failed this time she would be willing to submit to this operation on a future occasion. It was accordingly decided to let the pregnancy continue till full time and then, if necessary, carry out pubiotomy. The fact that the patient was a multipara was recognised as enhancing the chance of a safe delivery being obtained by this means. The patient refused, even after strong advice given by Dr. Gardner and myself, to leave her house in favour of a nursing home.

Labour set in on the 27th August 1911 at 8 A.M. I saw her at 4 P.M., when the pains were very severe and very frequent, and chloroform was immediately administered by Dr. Gardner. The patient was slung up into the lithotomy position, the vulva was shaved and painted over with linimentum iodi, as were also the lower abdomen and the inner side of the thighs. The preparations were all carried out before the patient was examined, as

by this means it was believed that the risks of infection would be diminished. The examination, which was then made, showed the head to be well down in the pelvis and fixed in the R. O. P. position. It should be mentioned that the foetal heart could not be heard at any point in the abdomen, and this, we feared, pointed to some calamity, but it was attributed after the examination to the posterior position occupied by the child.

The bladder was emptied, the membranes were ruptured, and the forceps was applied in the hope that we might be dealing with a small head, and that with the moulding present it might be delivered instrumentally. In addition, the application of the forceps before division of the pubis, should this be necessary, obviates the risks of excessive separation of the bony edges with the attendant risks of laceration of the soft parts, which are present, if their application is carried out at a later stage. Three strong pulls failed to move the head in the least. The fixation of the head in a cavity constricted transversely determined us against attempting to rotate it into the anterior position, and pubiotomy was immediately carried out according to the method described by Döderlein. Some slight difficulty was encountered in passing the point of the curved needle through the opening in the periosteum made by the transverse incision along the upper margin of the pubis on the left side. When once introduced, however, it was easily guided along to the lower margin, at which it was projected under the skin. After forcibly dragging the left labium majus over to the other side to avoid injury of the subjacent vascular tissues the skin was incised and the point of the needle pushed through. The Gigli saw loosely fixed to the hook was then drawn through and severed the bone in a few minutes. Meanwhile the thighs of the patient were pressed together to prevent undue separation of the bony edges. The completion of the division of the pubis was recognised by the sensation given by the saw being dragged across the soft parts and by moving the finger down the front of the bone, when the breech was felt all the way down. There was only slight oozing from the wound, the greater amount of blood escaping through the upper opening. Altogether there could not have been more than one ounce lost.

The head was now extracted with the forceps with great ease and was soon followed by the trunk. During the process, so far as we could judge by the finger, the pelvic edges were separated at the most about $1\frac{1}{2}$ to 2 ins. This measurement is only approxi-

mate. During the extraction of the head the anterior vaginal wall tended to bulge out in front of it, and it could easily be seen how, unless great care were taken, the bladder would be torn from its bony attachments. This risk was obviated by using the left hand to hold and push back the prolapsing vaginal wall whilst the head was being extracted with the right hand. The perineum and vaginal walls were intact. There was no difficulty with the placenta. At the end of the operation the general condition of the patient was excellent; the pulse-rate was 66. The child was a well-developed and healthy female infant.

The lower wound was closed with horsehair, and covered with collodion; the upper also was closed except for a gap left at its outer part for a small gauge drain passed down for about two inches, care being taken to avoid inserting it between the bony edges. This drain was left in for two days. The lower wounds healed by first intention and the upper healed without the least difficulty under a collodion dressing applied after the removal of the drain.

The pelvis was supported for 3 days with a strip of 3-inch wide strapping rolled twice round the body. This was removed after the bowels moved, and was replaced by two strips, one on each side, passing back to the level where the body of the patient rested on the bed. The two strips were drawn firmly together in front by tapes passed through holes near the edges of the strapping. This arrangement was found quite satisfactory from the point of view of steadying the pelvis, and was infinitely more convenient for the nurse, as also for the dressing of the upper wound. It should be mentioned that the patient lay throughout in an ordinary bed with a firm mattress.

In connection with the after-treatment it should be mentioned that catheterisation was necessary for twenty-four hours. The urine drawn off was blood free. A hæmatoma, which formed at the most dependent part of the left labium majus, gave rise to some pain and discomfort, but it disappeared completely in fourteen days. Except for a sudden rise of temperature to 102° F., with as sudden a fall, early in the third week, the temperature never at any time rose up to 99° F. Except for two registers of 98·6° and 98·8° F. the temperature throughout the whole of the first fortnight was either normal or slightly subnormal. In other words there was a complete absence of even a mild septic infection such as is mentioned amongst the risks of the operation. As already indicated, also, there was no injury to the bladder

and urethra, another accident sometimes associated with this operation.

In this case the narrowing of the outlet, whilst alone sufficient to constitute a distinct obstacle to the passage of the child, was complicated by the occipito-posterior position occupied by the head. It is possible that an early examination might have led to a detection and rectification of this abnormality before the head became fixed in the pelvic cavity, but the narrowing present would almost certainly even then have precluded the possibility of a simple forceps extraction, and, in addition, the risks associated with infection would have been multiplied in the event of the pubiotomy being carried out. It is likely that the posterior position was dependent on the pelvic narrowing, and the want of any attempt at rotation was doubtless traceable to the same factor.

The patient got out of bed on the 17th day, and, except for a slight limp, which improved as she began to go about, there was no mechanical disturbance of any kind. When seen six weeks after the operation there was still a trace of the limp. The patient told me that she felt no discomfort on walking, but she imagined that her left leg felt a little weaker than the right. Dr. Gardner informs me that by the third month there was no trace of the limp. The patient is able to go about her duties without the least trouble of any description.

The child, which was $8\frac{1}{4}$ lbs. at birth, has never given any trouble.

An X-ray photograph, taken by Dr. McKendrick six weeks after the operation, shows that the pubic union is of a fibrous nature, and in addition that there is a small amount of separation of the articular surfaces of the sacro-iliac joints. This, no doubt, is dependent upon the slight separation of the pubic edges in front, with a consequent eversion of the innominate bones.

In conclusion, I would say that this case demonstrates what has been repeatedly shown on the Continent, in Dublin, Glasgow, and elsewhere, that the operation of pubiotomy may be employed with complete success in a suitable case if the requisite precautions be observed. It is interesting to note that the operation is still, so far as one can see, almost if not wholly rejected by the two great obstetric centres, London and Edinburgh. Personally I believe that the utility of the operation is beyond doubt. A factor which above all has conspired in its disfavour has been the unfortunate results attending on its employment in

infected or suspicious cases. The recent literature shows that injury to the bladder and urethra is becoming progressively less and less common.

From some interesting data supplied by an after-study of his cases Whitridge Williams concludes that the operation is especially useful in outlet contractions. Measurements were carried out after the lapse of an interval of time for the purpose of determining what effect, if any, the operation had exerted upon the size of the pelvis. In 16 out of 35 cases the distance between the tubera ischii had become increased following the operation. This increase varied from 1 to 3 cm. and averaged 1.62 cm. In three of the cases pubiotomy was carried out for dystocia in typical funnel pelves, and in them the subsequent increase in the bisischial diameter was from 7 to 8, 7 to 8.5, and 6 to 9 cm. respectively. In some cases there is, in addition, a slight permanent increase in the conjugata vera, but this is not so constant or so marked as the expansion of the outlet.

For these reasons pubiotomy is to be looked upon as the operation of choice in severe dystocia in a funnel pelvis demanding radical interference, for not only does it allow of an easy termination of labour, but in the majority of cases it results in a permanent enlargement of the outlet, with the prospect of subsequent spontaneous deliveries. By its means many narrowed pelves can be transformed into pelves of normal dimensions. Williams considers the operation of especial value in primiparous patients, because by deciding to carry it out if necessary one can await the test of labour.

Whilst there can be little doubt that the rule as formulated in the last paragraph is a useful ideal, it is one which must be subject to many exceptions, determined by the presence or absence of expert skill, etc. It is natural that Whitridge Williams should over-value the advantages of pubiotomy, as he deprecates induction, recognising only one, what may be called mechanical, indication for its use, namely post-maturity of the child. Whilst it may be true that in expert hands excellent results can be obtained in a primipara by the expectant line of treatment, terminated if necessary by pubiotomy, there can be no doubt that, taken all over, the best average results are gained by induction. The maternal risks must dominate the issue in the mind of the medical attendant. Alike from the domestic and the civic standpoint the mother's life is more important than that of the child, and whilst the maternal risks in induction are practically nil, the

mortality from pubiotomy (as also of Caesarean section in the most suitable cases) is not under 2 or 3 per cent. Any departure from these considerations must be taken only where the mother is prepared to assume the extra risks. Such was the case in the record I have just read.

SECOND CASE.

Induction of Premature Labour.—In the management of this patient I was associated with Dr. Macalister of Forfar. She was a tall well-developed girl of 21, in whom the existence of a pelvic abnormality would scarcely have been suspected. She was first seen by Dr. John Phillips of London, who recognised the existence of the pelvic narrowing and indicated the possibility of an induction of premature labour being necessary. Her menstrual dates pointed to full time being about the 8th October 1911.

The measurements of the pelvis were as follows:—

Interspinous diameter . . .	20 cm. ($8\frac{1}{2}$ ins.).
Intercristal diameter . . .	25 cm. (10 ins.).
External conjugate . . .	18 cm. (7 ins.).
Diagonal conjugate . . .	Promontory could not be felt.
Between the tubera ischii . .	7 cm. ($2\frac{4}{5}$ ins.).
Antero - posterior diameter of outlet	11.5 cm. ($4\frac{1}{2}$ ins.).
Posterior sagittal diameter . .	8 cm. ($3\frac{1}{5}$ ins.).

An examination was made under chloroform on the 2nd September, and it was found by employing the manipulative method described by Munro Kerr that the head descended easily through the pelvic brim. As far as it was possible to say by palpation, the head seemed to be small at this date. The reason for the attempt to gauge the relative size of head and pelvis was based upon the belief that any difficulty in forcing the head through the brim would point, in the presence of the apparently roomy nature of the pelvic inlet, to an unusually large size of head, and this would give a positive indication for interference.

As it was, there was little to guide us in our treatment of the case. With the measurements of the outlet such as I have given them it was considered possible that a spontaneous delivery might occur if the patient were left to full term. As, however, the success or failure of this expectant line of procedure is determined to a large extent by a factor which we have no means of gauging with the least accuracy, namely the absolute size of the head, it

seemed to me that its adoption was associated with a distinct risk. Had the patient been a multipara the possibility of terminating, if necessary, the expectant treatment by pubiotomy, as in the case recorded above, might have been considered. Without further experience I am not prepared to perform pubiotomy in a primipara.

I should like here to emphasise a point to which little or no attention has been called, namely, that whereas it is now fairly easy to determine, by one or other of the methods devised for the purpose of gauging the relative sizes of the pelvic brim and foetal head, when to interfere by induction in a case of contraction of the inlet, we have no such methods to aid us in dealing with outlet deformities.

After consideration, however, of the data such as I have given them above, it was decided that the best results to mother and child would probably be gained by inducing labour, and it was determined to carry this out at the 37th week, the calculations being based on the dates given. This was accordingly done, and a bougie introduced on the 17th September was followed by the birth of the child on the 19th September. The labour lasted from 1.30 A.M. till 4 P.M. on the 19th September. The child was placed in the L. O. A. position, and the birth was normal except for a considerable delay in the pelvic cavity. The employment of forceps was avoided because of the well-known risks associated with instrumental delivery of a premature child. The perineum was uninjured. The recovery of the mother was uneventful. The child was 6 lbs. in weight at birth, and has since developed well in every respect. At the 9th week it was 9 lbs. 6 ozs. in weight. The mother was unable to nurse it, as she had decided to go to India for the Durbar and to leave it behind.

REFERENCES.—¹ *Obstetrics*, 1908, p. 705. ² *Trans. Amer. Gyn. Soc.*, vol. xxxvi. 1911. ³ "Die Geburtshülfliche Bedeutung d. Verengerungen d. Beckenausgangs," Volkmann's *Samml. klin. Vorträge*, No. 169.

TRAUMA AS A FACTOR IN DISEASE.

By ALEX. JAMES, M.D.

III.

EPILEPSY is a disease due to a peculiar instability of the nervous tissue, whereby there occur from time to time huge developments and discharges of nerve force or neurility, the so-called nerve storms. Epilepsy is distinguished from eclampsia or ordinary convulsions in this, that whilst for the most part in ordinary convulsions the nerve storm is the result of the exciting effect on normal nerve tissue of toxins not ordinarily present, in epilepsy the storm is primarily due to this instability of the nerve tissue itself, the amount of any exciting material in the blood or tissues being not more than what is ordinarily present.

That shock or concussion, or indeed any trauma whatever, should bring on or help to bring on this peculiar instability of nervous tissue which manifests itself by epilepsy can be easily understood. When we reflect, moreover, that epilepsy is a very common disease—six per thousand of the population—we can further understand that there must be many people living who on account of heredity, constitution, or habits are so constituted that the condition of their nervous tissue approaches very near that limit of instability which borders epilepsy. It follows, therefore, that as a factor in epilepsy, actual or relative, trauma must be a very common one, and further, that the severity of the trauma required in individual cases to cause epilepsy to manifest itself must vary enormously. In this way the real importance of trauma as a factor may vary, as it were, in individuals from nil to 100 per cent. This is, of course, only what we observe of trauma in all diseases. As a fact, however, it is probably brought before us more cogently in epilepsy than in any other.

But next, something must be said as regards the varieties of epilepsy, and their connection with trauma. It will be obvious that as *epilepsia gravior* and *epilepsia mitior* represent mainly differences as regards the severity of the nerve storm, and as they often occur at different times in the same individual, a trauma which can bring about the one can equally well bring about the other, or can bring about both. With Jacksonian epilepsy, however, there may be a difference, which though not by any means

absolute, has yet to be recognised—this is that, when, as frequently happens, trauma is a factor in its onset, the trauma has had the effect of causing this instability of nervous tissue along a certain tract or set of tracts only, leaving tracts and nerve tissue elsewhere relatively stable. Here it must be noticed it has been said *relatively* stable, for it is no uncommon thing to witness all degrees of transition between the Jacksonian and the generalised paroxysm.

Of fifty-six infirmary patients, boys and men, affected with epilepsy of whom I have records, trauma or shock was indicated by themselves or by their relations in twenty instances. Of these twenty ten were under twenty years of age and ten over it. In two of the ten adults the epilepsy was distinctly of the Jacksonian type, and it is interesting to notice that in these records localisation of the paroxysms to a greater or less extent is much more marked in the adult cases than in the cases under twenty years of age. This seems to indicate in a general way that trauma, when acting as a factor in epilepsy, is apt to show itself more definitely in the adult than in early life.

EPILEPSY CASES UNDER TWENTY YEARS OF AGE.

1. Thomas T., aged 15, a message boy, was admitted 15th May 1895 suffering from epilepsy. His family history was not very good. He had had the usual children's ailments, and at the age of 9 he had had an attack of acute rheumatism.

His accident occurred three years before—he was struck on the head by a swingboat, the blow being very severe and making him quite unconscious. He was at once taken to Ward 13, surgical, and there Mr. Caird found a large lacerated wound over the right frontal bone, just at the margin of the hair, and extending up over the scalp. On removing the clot, brain matter was found amongst the hair, and a circular opening with ragged edges, about the size of a shilling, was found, through which bits of bone had been pushed into the brain. Pieces of detached bone were removed, and depressed portions were raised up, and gradually the wound healed. After eight months' residence in hospital he was discharged with a plate to protect the cicatrix. He remained well until 6 months ago, when one day on the street he took his first paroxysm of epilepsy. Since then the fits have continued, and for the last month they have been more frequent—about once a week.

In this case the trauma was so severe that although the family history was not good, and although the boy himself had shown a rheumatic tendency, we had little hesitation in ascribing to it a very important causal influence. With the injury in the position in which it was, we inquired carefully as to any aura and as to any special localisation of the paroxysm. He had no aura, however, and the fits were severe and generalised.

2. Robert J., aged 13, a schoolboy, was admitted 7th January 1893 complaining of fits. As regards heredity there was a phthisical tendency in the father's family, and the father was rather a nervous man, somewhat addicted to alcohol. He had had no previous illnesses.

His accident occurred eighteen months ago. When playing in the street he was knocked down by a passing cab, the cab striking him on the forehead above the left eye. He was stunned, and told us that when he came to his senses he found himself in a chemist's shop. His first fit occurred two days after this, and he has been having paroxysms at intervals since.

On admission we found the remains of a small abrasion, about two inches above the left eye, which he said was caused by the accident. We found also that many of his fits were preceded by an aura, which he described as a tickling feeling in the ball of the great toe of the left foot. This tickling feeling, he said, passed up the leg to the head, and then caused the fit, and he said also that he could often stop the fit by gripping the leg tightly when the tickling began.

In this boy the aura was often a very well-marked one, and for a few days after his admission into the ward, and when the fits were occurring frequently, it was discovered that when the skin over the ball of the left great toe was tickled—as in testing the plantar reflex—he cried out and gripped his leg, feeling as if a fit were about to come on. Then we were also able to discover that the muscle contractions of the paroxysm began in the left leg and thigh, then passed to the right, then to the left arm, and so to the right, and lastly to the face and head. The paroxysms themselves, however, although general, were not severe ones—he did not bite his tongue—his recovery was rapid, and the flea-bite-like hæmorrhages on the forehead were never seen. Further, there was no real difference between the left and right leg as regards muscular power, knee- and ankle-jerks, etc.

In this case we believed that there was no gross brain lesion

the result of the accident, and though we recognised that his injury could not but have had some prejudicial effect, we believed that his epilepsy was due mainly to constitutional factors. Apart from his heredity, we found that his mental condition was unstable, and had been so for long. The ward nurse told us that she had great difficulty in keeping him out of mischief in the ward after he was sufficiently well to be going about, and his mother told me that before his accident he had always been a mischievous boy, and was constantly being severely whipped by his father in consequence.

3. David M., aged 12, a message boy, was admitted 12th April 1897 with a history of epilepsy of five years' duration. His family history appeared good, and he had had no previous illnesses. He was a rather fat, healthy-looking boy, with a slight internal strabismus of the left eye. He described the onset of his first fit five years ago as follows:—

He was returning home one dark night, and while passing a cemetery he slipped on a stone and fell, causing his nose to bleed. He then shivered, cried out, and went into a fit. He was discovered and carried home, and the fits have continued at intervals since. Lately they have been becoming more frequent and severe.

In this case we believed that the factor was mainly a constitutional one. He was evidently a rather nervous boy.

4. Andrew N., aged 18, a miner, was admitted 7th February 1899 suffering from epileptic fits. His family history appeared good, his home surroundings comfortable, and his habits were reported satisfactory. Except for some slight attacks of sore throat, he had had no previous illnesses.

Accidents.—When 9 years old he received a severe blow on the right side of the forehead from a piece of wood. The scar of this is still evident. When 11 years old a water-cart ran over the outer surface of his right foot, crushing it severely and confining him to bed for some weeks.

His first attack of epilepsy occurred about twelve months after the latter injury. In this attack he noticed nothing strange about his foot at the time, but in most of the subsequent attacks he recognised their onset by an aura proceeding from the sole of the injured foot. This aura showed itself as a feeling of numbness with some tremor in the foot, and he could sometimes ward off an attack by firmly gripping the ankle. He told us also that he had been able to bring on a fit by forcibly bending the toes of this

foot, but that he had not been able to do this lately. Examination showed that there was no real difference between the right and left legs as regards muscular power and knee- and ankle-jerks.

Coming on at the age of twelve years the epilepsy was probably constitutional, but the first accident may have intensified the susceptibility, and we considered that the foot injury had determined the nerve storm and where it should start. He improved in the ward, and was then sent to the surgical hospital, where his right sciatic nerve was stretched. This produced considerable improvement in his condition.

5. Alexander M., aged 11, a schoolboy, was admitted 7th July 1893 suffering from epilepsy.

Except that his father was intemperate, his family history was good. He had been quite healthy till eighteen months before, when he was knocked against a wall, striking it with the back of his head. He complained of pain at the spot, and a day or two afterwards he fell, striking his head at exactly the same spot, on the hearth. He got up, cried, and in about two minutes took his first epileptic fit. These have been persistent and general, and no distinct aura has been noticed.

In this case we believed that the injury had had very little influence.

6. Alexander M., aged 19, a printer, was admitted 26th June 1901 complaining of epilepsy. His family history was not very good, his home and work surroundings were satisfactory, he was teetotal, but smoked about four ounces of tobacco a week. He had had no previous illnesses.

Accidents.—Ten years ago he was knocked against a wall, the back of his head coming in contact with it. He was stunned at the time, and for a year afterwards he had epileptic paroxysms, varying in frequency from one a day to one a week. As the result of medicine these attacks stopped. Three years ago he had a compound fracture of the right forearm, from which he recovered satisfactorily. Four months ago, after exposure cycling, he took rheumatic fever, and was in bed for four or five weeks. After his recovery from this he felt very shaky and nervous, and in May last he took a distinct epileptic convulsion. These have been recurring since, and he described them as ushered in by a feeling of sickness and by palpitation.

In this case, although the disease may have been precipitated by his head injury at the age of nine, we thought that the epilepsy

was due mainly to constitutional causes. It was, however, recovered from, until the period of debility after the attack of rheumatic fever enabled it again to assert itself.

7. James M., aged 11, a schoolboy, was admitted 30th June 1901 with a history of epileptic fits. His family history and his home and school surroundings appeared satisfactory. As regards previous illnesses, he had had whooping-cough and measles.

His accident occurred about a year ago—he was struck on the right parietal eminence, the blow cutting the scalp right through to the bone. He was not unconscious, but the wound seems to have been sufficiently severe to cause absence from school for about six weeks. The fits occurred when he returned to school. He had no aura.

In this case the somewhat severe injury had probably some causal share in inducing the disease.

8. James G., aged 15, a message boy, was admitted 19th March 1901 with fits. His family history was not very good. His surroundings at home and work were comfortable.

His accident was a fall from a wall three years ago. He landed on his head, and he was unconscious for a day. His epileptic attacks, which were typical, began two years ago. At first there was no aura, but now he knows a fit is coming on by tremblings in the hands, passing up the arms to his head. The fits have been becoming more frequent recently.

In this case, also, the accident was a severe one, and probably had some causal influence.

9. John P., aged 10 years, a schoolboy, was admitted 11th November 1904 complaining of fits. His family history appeared good, and his surroundings comfortable. His only previous illness was an attack of whooping-cough.

His accident occurred four months ago—he fell off a cart on his head. He was not unconscious, and walked home, and except for his head aching at times he thought he was none the worse. Five weeks ago the fits began to occur. These have been becoming more frequent, but they are not typical, being more of the nature of hystero-epilepsy. After a fortnight's treatment in the ward, and some arsenic internally, the fits ceased, and the boy returned to his home apparently quite recovered.

This boy we believed to have a nervous constitution, and we

considered that the accident had not been a very important factor in his condition.

10. George R., aged 5, was admitted 4th May 1893 with epilepsy. His family history was not good—a family history of alcoholism was suspected—and his mother, who died when he was six months old, seems to have been insane. He had occasional convulsions when teething, and had always been a nervous boy. Four months ago he had a fall on his head, and since then he has taken fits of general epilepsy, sometimes ten to thirteen a day, and then for a week or a fortnight none at all. He has been becoming weaker physically and duller mentally.

In this case we thought it probable that the fall was really the result of a fit.

EPILEPSY CASES OVER TWENTY YEARS OF AGE.

11. James M., aged 44, a dock labourer, was admitted 21st November 1894 suffering from epilepsy. His family history appeared good, and except for occasional rheumatic pains he had had no other illnesses. He had frequently indulged in excess of alcohol.

He had had a very serious accident when about 10 years of age; he was then thrown from a pony, falling with his head on the kerbstone, and for this he had lain in hospital, unconscious, for about seven weeks.

His epilepsy began twelve years ago, that is to say about twenty-two years after his accident. It was noted, however, that the attacks began for the most part in the right hand, and that the scar of this accident was over the left parietal bone, not far from the arm area corresponding.

With general treatment and bromides his condition greatly improved.

In this case we believed that the accident might have had some causal influence, but that the real factors were constitution and alcoholic excesses.

12. Frank M., aged 42, an iron-turner, was admitted 3rd October 1895 suffering from epilepsy. His family history was only fair. He had had no serious illnesses, and though he had not been teetotal, he was now moderate as regards alcohol.

He had had two serious accidents; the first was about fourteen years ago, when he fell against a wall, cutting his head over the upper part of the frontal bone on the left side, and being uncon-

scious for about ten minutes: the second accident was four years ago, when he smashed his left index finger with a hammer when at work. Septic changes followed, and he came to hospital for some weeks, several incisions in the finger and the hand having to be made to drain off the pus.

His epilepsy began three years ago, and he gives of it the following account:—

One day about three years ago, while playing the flute, he felt a curious sensation, as if of coldness at the lower part of the abdomen. This was associated with a faintness, after which he felt a little dazed and dull for a few minutes. The same thing occurred on the following day, and similar attacks at short intervals have occurred ever since. About two years ago, however, he noticed that before each attack a trembling sensation in the injured finger occurred, and his wife tells us that as he comes out of his dazed conditions he always raises his left hand and looks at the finger. Three weeks ago a distinct attack of epilepsia gravior occurred, since which he has had no slight attacks. This, however, brought him to the Infirmary for treatment.

In this case it is difficult to indicate the relative importance as factors in his disease of his constitution, his habits, his first and his second injury. We believed that all had played a part, the last injury probably having determined also where the nerve storm should commence.

13. Alexander M., aged 45, a miner, was admitted 12th September 1899 complaining of epileptic fits and weakness. His family history was not very good, his surroundings at home were comfortable, his habits were satisfactory, but he said that he had had a lot of worry for years. As regards accidents, he got a severe knock behind the left ear twenty-three years ago, which laid him up for about two months.

His epileptic attacks, which are mild, began ten weeks ago, his first being in the mine when he was at work.

We did not think that the old accident was of any real importance. He was in reality much older than his years, and he was very much run down in health. He was correspondingly benefited by hospital rest and treatment, and his attacks ceased, and he was able to go home looking better and feeling again able for work.

14. George S., aged 76, an auctioneer, was admitted 11th April 1901 complaining of epilepsy. His family history was

excellent, his home and work surroundings satisfactory, and he had been careful as regards alcohol and tobacco. He had had practically no previous illnesses.

Accidents.—He had had several falls from scaffoldings when he was a builder, but the last and most severe occurred sixteen years ago—a scaffolding on which he was standing gave way and he fell three storeys, injuring his head and dislocating his right arm.

His epilepsy began eight years ago. He told us that sometimes he would have two fits in a day and then none for several weeks. He had no special aura. He described a feeling of tightness in the head, and then he became unconscious and twitched.

In this patient's case I was of opinion that the epilepsy dated in reality from some softening occurring about eight years ago. Physically and intellectually he had been gradually deteriorating, and at present his memory was not trustworthy. Falls such as he had had must have left some effect, but we could not attribute to them any very distinct causal influence.

15. George N., aged 29, an engineer, was brought to the Infirmary 7th April 1896 by the police, having been found on the street in a fit. His family history was not good—his father died of consumption. As regards previous illnesses, he had some bowel inflammation six years ago and pleurisy recently. His account of himself proved not altogether trustworthy, but was as follows:—

Four years ago he fell off a scaffolding, in height about twelve feet, landing on his shoulders and head. He was only slightly stunned, and went on with his work. Headaches began to trouble him, so that he gave up his work of engineering and became a tailor. Two and a half years ago he had his first fit, preceded by an aura which he described as a twitching in the little and ring fingers of the right hand. Since then paroxysms with like aura have continued at intervals.

On examination of this man a small circular depression was found on the left side of his head, just about the arm area. This, he told us, had been caused by the fall, but when some weeks afterwards it was cut down upon by a surgeon, with the idea that surgical interference might benefit him, it was found to be an old trephine opening, nearly filled up by bone. Of this he had given us no inkling, and we had to note a distinct hysterical untrustworthiness about him. In this way it was impossible from the information we obtained to come to any conclusions as regards the trauma and its effect on his condition.

16. James W., aged 33, an engineer, was admitted 2nd May 1899 suffering from epileptic attacks, headaches, and great decline in strength. His family history was uncertain, his home and work conditions fairly good. As regards previous health and accidents he gave the following history:—

When a child a thorn ran into his left foot, as the result of which he stated he had lockjaw. At the age of eighteen he lost the point of his right thumb by an accident. At the age of twenty-one he had another accident to his right hand, necessitating the amputation of his forefinger. He had had otorrhœa fairly continuously for years.

Immediately after the second wound in the hand, *i.e.* about twelve years ago, he began to suffer from attacks of petit mal, and these after about a year merged into ordinary general convulsive paroxysms. He had been trephined over the right arm area on two occasions without result, and at no time had there been any aura pointing to special lesion about this part.

In this man the disease, coming on at the age of 21, was probably due to constitutional causes. The hand injuries, however, may have had some determining effect on the condition.

17. Alexander M., aged 35, a butler, was admitted 2nd December 1900 complaining of fits, and also of dull aching pains in the head and giddiness. His family history was not very good. His surroundings had been satisfactory, and he had been temperate. As regards previous illnesses he gave a history of smallpox only when 10 years of age. He had never been, however, a strong man.

His epilepsy, which is more of the hystero-epileptic form, he dated from a nerve shock eight years ago. The gentleman with whom he was travelling died suddenly in his arms, and he told us that he was so upset that he took five fits that day. These have recurred now and again since.

In this case the main factor was the constitutional one.

18. James N., aged 42, a labourer, formerly a soldier, was admitted 25th February 1902 complaining of epilepsy (*petit mal*). His family history was good. His habits had not always been temperate, and as regards previous illnesses he had had smallpox, sciatica, and fever and ague in India. For the last six years he had had good health and had been temperate.

His accident occurred six months ago—he was knocked off

a scaffold, falling fourteen feet, injuring his left ankle and foot, but causing no fracture nor dislocation. A week after this his first attack occurred. It showed itself as a sensation of weakness and shaking in the legs, back, and arms, with lightness and giddiness in the head. When such a turn came on he felt queer and weak, had to stop whatever he was doing and to hold on to some support. He was never completely unconscious.

These attacks had been coming on, sometimes daily, sometimes at longer intervals, up till his admission. With rest and bromide of potassium he improved markedly, and was able to go back to work.

In this case constitution and habits were probably the important factors, the accident, however, being the determining one. The epilepsy was mild, and under improved conditions of life it practically disappeared.

19. William L., aged 44, a brewery worker, was admitted 21st October 1898 affected with epilepsy, confined mainly to the right arm and leg (Jacksonian). His family history was fairly good. He was a heavy smoker, and drank large quantities of beer.

As regards previous illnesses, he had had smallpox when 9 years of age. In his youth he had had gonorrhœa, and he had influenza and pneumonia about eight years ago.

Accidents.—Twenty-five years ago an iron ball from a crane dropped from a height on the left side of his vertex, where a slight hollow and cicatrix remains. At that time he was in hospital for six weeks. Last November he had his right ankle crushed by the wheel of a lorry, and was then in the surgical hospital for three days.

His first attack occurred four years ago whilst he was asleep in bed. It and subsequent ones commenced by cramps in the right foot and leg, passing up to the arm, and not always causing complete loss of consciousness. He was a fairly well-developed muscular man. His voluntary motor power was rather less in the right leg than in the left, and the knee and ankle jerks were rather more marked on the right side. Since the attacks have been becoming rather more frequent he is intellectually not so good as he was, being at times forgetful.

In this man constitution, and specially habits, were the important factors, but in the accident of twenty-five years ago and in that of the previous November the central and peripheral

extremes of the nerve mechanism of his right leg appear to have been so markedly involved that we cannot but ascribe to both of them some causal influence.

20. James M., aged 34, a stoker, was admitted 14th September 1895 affected with fits involving the right side of the body, the arm, leg, and face (Jacksonian). His family history was good. He had had no previous illnesses, his home surroundings were comfortable. At work he was much exposed to extremes of temperature. He had always been a heavy beer drinker.

His accident occurred nineteen years ago, when he was fifteen years old—he had a fall from a height, and injured his right ankle, so that he had to be carried home. Immediately after being put to bed he took a fit, which involved his right leg and arm. He was then sent into the Infirmary, and was treated for three months, having had no fits at all for the last of these months. He then went back to work, and remained free from fits for seven years. They then began to recur exactly the same as before. He was again treated successfully, and after a month in hospital returned to work. He remained well till a week ago, when again they returned without any apparent cause or warning. This time, however, the fits were more severe, and came on more frequently, often in a series of six or eight at a time.

On our examination we found him a short, thick-set, strong-looking man. During his residence in hospital he had sometimes as many as fifty attacks in a day, never, however, losing consciousness. After a series of fits it was noticed that his right arm and leg were paretic for a time, showing increased elbow, knee, and ankle jerks. As he improved through the rest and treatment in hospital, and when no fits had been occurring, the motor power in arm and leg was recovered, and the increased reflexes disappeared. He was discharged practically well at the end of a month.

In this case we believed that the epilepsy, coming on as it did in early life, was constitutional; but there was no doubt also that this nerve instability had been intensified by his habits. Still the localisation of the paroxysms to the parts injured indicated that to the injury some causal influence must be ascribed.

This man was a stoker, and in discussing his case an aspect which we contemplated was that the accident, by its having increased the instability of his left Rolandic area, had possibly invested it with a safety-valve-like action. In this way when in his

case, as the result of constitution and beer drinking, an epileptic stormburst was imminent, the widespread havoc to his whole brain was being prevented by localised escapes. Needless to say we impressed on him the vital importance of total abstinence.

In the cases of epilepsy which we have considered, and in the cases of meningitis and brain tumour to the consideration of which we have now to pass, the large proportion of boys and youths among them forces upon us an important realisation. This is, that whilst boys and youths may not be so exposed as men to very serious accidents, yet among them falls and knocks of all kinds are distinctly more common. At the Edinburgh City Hospital some years ago, when there was a run of cases of cerebro-spinal meningitis, some seven per cent. of those admitted were found to give a history of recent falls or knocks on the head, and lately an inquiry on similar lines in the cases brought in with measles and scarlet fever were found to yield a percentage of falls or knocks even higher than this. True it is that falls or knocks on the head, which are followed by head affections like meningitis or brain tumour, are much more likely to have been impressed on the parents' memories than those followed by measles or scarlatina, still it is important to remember that in early life such injuries are extremely common. It is also important to remember that to gauge the real severity of a knock or fall from the symptoms at the time is not always easy, for a knock on the head which will make one child dazed or unconscious might have little effect on another. Obviously, then, in forming an opinion as to the part played by injury in the young, precise information as to what it was and precise information as to the sufferer's heredity, health, and constitution are no less essential than they are in the adult.

MENINGITIS.

Of fourteen cases of meningitis, two gave a history of accident, but, as will be seen, in neither could the accident be regarded as the important factor in the disease.

1. James R., aged 17, a joiner, was admitted 12th June 1897 with symptoms indicating tubercular meningitis, and died 20th June, the sectio confirming the diagnosis.

History. — Family history appeared good, home and work surroundings satisfactory.

As regards previous disease, we ascertained that when about a year old he had had an abscess in the left axilla, following vaccination; also that his head was noticed to be rather big, and that he had been accounted somewhat delicate till he was seven years old, when he seemed to have grown quite strong. He then had attended school, and did his school work all through most satisfactorily. He began his work as a joiner eighteen months ago, and was then apparently strong and well.

His accident occurred three years ago—he fell on the ice, striking the back of his head so severely that he was unconscious for some minutes. He soon recovered, however, and was apparently none the worse, till three months ago, when his parents noticed that from no apparent cause he was becoming dull, dazed, and lacking in his usual vigour. After a few weeks frontal headache, vomiting, and loss of flesh showed themselves. These symptoms had been progressing, and on admission we found him somewhat stuporose, his eyes showing blurring of the discs at their upper, lower, and inner margins. As already stated, he died in the ward about eight days after his admission.

In this case the accident produced distinctly severe symptoms at the time, but the boy was constitutionally very delicate, and unfit to withstand the ordinary knocks of life.

2. John M., aged 4 years, was admitted 13th August 1897 with symptoms indicating meningitis, and died 21st August, the sectio confirming the diagnosis.

History.—Family history not good. He had had no definite previous illness, except chicken-pox about a year ago, but his mother told us that for the last eighteen months he had had screaming fits at intervals on waking up at night.

His accident occurred four months ago—he fell on the pavement, striking the centre of his forehead on the ground; he was not, however, rendered unconscious. Three months ago he was noticed to be becoming fretful. He cried at times for no apparent cause, for when asked if he had pain he always answered No. Soon, however, he distinctly complained of headache, and began to vomit, to lose flesh, and to become dazed and stupid. On his admission distinct blurring of both discs was made out. As already stated, he died eight days after his admission.

In this case the accident was slighter than in the former case (James R.), but the boy was still less fit constitutionally.

BRAIN TUMOUR.

Of twenty-six cases of brain tumour, four gave a history of trauma, but in two of these only did we consider it to have been of any consequence, etiologically.

1. John M., aged 5 years, admitted 20th January 1899 presenting the symptoms of brain tumour. His headache was constant and frontal, but often shooting back to the occipital region. His vomiting was characteristic. He had dimness of vision, with changes in the optic disc, and he was somewhat stuporose.

In the following few days he rapidly got worse. He became more stuporose and completely blind, and twitchings showed themselves, specially in the left arm and leg and the left side of the face. At the section a tubercular tumour, $2\frac{1}{4}$ ins. by $1\frac{3}{4}$ ins., was found in the middle of the cerebellum, compressing the fourth ventricle and foramen of Magendie, and causing great dilatation of the ventricles.

History.—His family history was not good. His mother was delicate, and his father died of heart disease at an early age. Both parents of his mother died of phthisis. He had had no previous illnesses, but two months before his admission he had fallen, alighting on his forehead. He felt very giddy at the time, and his headaches and other symptoms date from this.

As a factor the accident was probably of very little importance in this case; the condition was really a constitutional one.

2. Thomas A., aged 12, a schoolboy, was admitted 11th October 1905 presenting the cardinal symptoms of tumour—headache, giddiness, vomiting, and optic neuritis; he had also some paresis of the external recti in both eyes. No other paresis or paralysis was present, but he described occasional feelings of tickling in both legs. Cerebral tumour was diagnosed, but we could not locate it.

History.—Family history appeared satisfactory, and, with the exception of measles some years ago, he had had no other illnesses.

His accident occurred ten months ago—whilst sliding on the street he fell, his occiput striking on the hard ground. The headache and giddiness following this seem to have been severe, for he was in bed for three weeks after. He then got better, and was going about apparently well. Six months ago, however, the headache and giddiness returned worse than ever, and after a few

weeks his mother noticed the squinting. These symptoms continuing, he was advised to come to the Infirmary. In this boy's case the symptoms became aggravated during his residence in the hospital, and the prognosis being so grave the parents decided to take him home.

We believed that the accident had been a factor in his disease.

3. George B., aged 33, a carpenter, was admitted 23rd January 1897 presenting the cardinal symptoms of brain tumour. His headaches were mostly occipital, and were often associated with vomiting. He had impaired vision, with some whitening of the optic discs, most marked in the right eye, also some proptosis, specially of the right eye. He presented no special localising symptoms, and the diagnosis was cerebral tumour, probably about the posterior part of the brain. His symptoms had begun to develop about eighteen months ago.

History.—His family history was good, surroundings at home and at work satisfactory. He had always been careful as regards alcohol, and gave no history of specific disease. He had always been healthy, but as a boy he had had a portion of his left upper maxilla with two teeth removed, he said, on account of a growth there.

Accidents.—Eight years ago he fell from a height of two storeys, injuring his feet and ankles. Three years ago, when carrying a heavy plank, he fell, striking the back of his head against the ground. Two years ago, whilst kneeling, a heavy beam fell from a height of six feet on the back of his neck. He was knocked flat, and though not unconscious he felt very giddy and staggered about for some time afterwards. A few months after this he noticed some impaired vision and headaches, and these and his other symptoms he attributes to this last accident. After about a month's residence in hospital this man was discharged *in statu quo*.

In his case the last accident was severe, and we ascribed to it some causal influence in his disease, but along with this we had to take into consideration his accident of eight years ago and the bearing on his case of the old disease of the left upper jaw.

4. William B., aged 33, a miner, formerly a soldier, was admitted 25th May 1905 suffering from headache and occasional vomiting, so severe and marked that although ophthalmoscopic examination showed no change we suspected tumour (gumma of brain).

History.—His family history was good, and he had had no previous illness except syphilis, which he got when soldiering in 1893. He went to South Africa as a reservist in 1898, but was sent home on account of ulceration of the leg. He acknowledged alcoholic excess.

Accident.—Four months ago, as the result of exposure to bad air in the pit, he was rendered unconscious, and he told us that his lamp was extinguished (black damp). Next morning he could not go to work on account of severe headache, sickness, and vomiting. Since then the headaches have continued. They are specially bad in the morning and forenoon, some days worse than others, and at times so unbearable that he has had to have large doses of morphia. They are felt all over the head. Three months ago a lump began to form in front of the ascending ramus of the lower jaw on the left side. This has gradually been increasing in size, but is not painful, interfering only somewhat with the movement of the jaw.

With large doses of the iodide of potassium, and with the rest and quiet of the ward, he rapidly improved. The headaches disappeared, as also did the tumour on the lower jaw, so that after some weeks' residence he was discharged recovered.

In this case the accident factor was probably of no importance.

THE METHODS OF EXAMINING AND ENUMERATING BLOOD-PLATES.*

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At the present time there is no general agreement regarding the nature of the blood-plates, and it cannot be said that an examination of their appearance and numbers throws light on the processes of disease.

At the same time records of the number of plates in disease are by no means numerous, and it is quite possible that an accumulation of such numbers might yield results of both clinical and physiological importance.

If the enumeration of the blood-plates is ever to become a common clinical procedure it is essential that the method should be reasonably simple and accurate. Many methods have been

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employed, and it has been the chief object of this research to make a careful comparison of these procedures. The results obtained by investigators as regards the average number of plates per c.mm. vary considerably.

Thus Pratt gives	469,000	per c.mm. to be the average.
Wright	„	225,000–350,000
Muir	„	200,000–250,000
Affanassiew	„	200,000–300,000
Kemp	„	778,000
Brodie and Russell	„	635,000

The methods of enumerating now in vogue are devisable into two groups—direct and indirect.

(1) In the direct method the procedure is exactly similar to that of counting the blood corpuscles by means of the Thoma-Zeiss haemocytometer, except that in some instances a special counting chamber has been devised.

Different media for dilution of the blood have been employed by different investigators, the objects aimed at being the prevention of clumping of the plates, staining of the plates, and in certain instances the decolorisation of the red corpuscles.

(2) By the indirect method the ratio of platelets to erythrocytes is determined in a drop of diluted blood. The number of erythrocytes per c.mm. being known the number of plates per c.mm. can be easily calculated.

The counts recorded by the direct method are much smaller than by the indirect. Thus Wright,² Muir,³ and Affanassie¹ will record the average as being not more than 300,000 per c.mm., while Pratt, Kemp, Deetjen, and Brodie and Russell record results varying from 469,000 to 778,000.

I. DIRECT METHODS.

The following pipette methods were investigated:—

1. *Affanassiew's Method*.—The diluting fluid is made up as follows:—

Sod. chloride.

Witte's peptone, āā 6 per cent.

Methyl violet, 1 in 100,000.

The ordinary leucocyte pipette is used for collecting and mixing the blood. Here the red blood corpuscles are preserved, and on this account it was found impossible to make accurate counts of the blood-plates.

2. *Wright's Method*.—The blood is diluted 1 in 100 by means of the pipette used for counting red blood corpuscles, and the ordinary Thoma-Zeiss counting chamber is employed, but a special cover-glass made by Zeiss is used. The diluting fluid consists of two parts of an aqueous solution of "brilliant cresyl blue" (1:300) and three parts of an aqueous solution of potassium cyanide (1:1400). The two solutions are kept separate, and are mixed and filtered immediately before taking the blood. The red corpuscles are decolorised.

In our observations we found difficulty in differentiating the plates, partly on account of the difficulty in thoroughly filtering the solution and secondly on account of the tendency for the plates to sink unevenly and so escape detection.

Wright's counts varied from 225,000 to 350,000; our counts were much smaller. There is great difficulty in cleaning the pipette after using this method.

3. A few observations were also made with blood diluted by Hayem's solution and Bizzozero's solution, which were used by Muir.³ The former seemed to allow the plates to form clumps, and the latter did not give good definition.

At an early stage it was found that the direct method had numerous disadvantages. The chief of these were as follows:—

1. Many of the plates agglutinate before the blood and medium are mixed.
2. The plates tend to adhere to the walls of the pipette.
3. Although a special counting chamber is used the film is still too thick, the plates tend to sink into different planes, and many may escape observation.
4. Where the erythrocytes are not decolorised by the medium the proportion of reds to plates is so great as to render the enumeration of the latter extremely difficult.
5. Where a powerful stain has been added to the medium there is great difficulty in cleaning the pipette after use.

II. INDIRECT METHODS.

The methods investigated belonging to the second class were those of Pratt,⁴ Kemp,⁵ Deetjeen,⁶ Van Emden,⁷ and Brodie and Russell.⁸

With the exception of Deetjeen's method the procedure is similar in all, the only difference being in the diluting fluid. In using the indirect method it is necessary that the slides and cover-

glasses be absolutely clean, otherwise the film does not spread out into a uniform layer when the cover-glass is placed on the slide.

The glass-ware was treated, as recommended by Pratt,⁴ by leaving it in a solution of sulphuric acid saturated with potassium bichromate for three days. It was washed in water and then placed in jars containing 95 per cent. alcohol.

Blood was drawn from the thumb, which was first washed with soap and water and then rubbed with alcohol and ether. A drop of the diluting fluid was placed on the thumb and the skin pricked through it. Blood was allowed to flow fairly freely.

A platinum loopful of the mixture was then brought in contact with a drop of the diluting fluid placed on the slide and mixed. The proportion of diluting fluid to blood should be at least four to one. The spread of blood must be so thin that the erythrocytes are well separated. A differential count of erythrocytes and blood-plates was made, at least 500 erythrocytes being enumerated.

An eyepiece micrometer ruled in squares was used for the counting, and the spread of the film was such that not more than forty erythrocytes came within the squares. In thicker films some of the plates escape notice.

1. *Pratt's Method*.—The solution is made up as follows:—

Sodium metaphosphate (Merck)	2.0 grms.
Sodium chloride	0.9 gm.
Distilled water	100 c.c.

With this solution it was found that clumping of the plates was prevented, that they could easily be differentiated and their shape and structure observed.

The solution has the disadvantages, first, that it does not long remain isotonic, and secondly, that after it has been kept more than about two months there is a growth of yeasts which interfere considerably with the count. The latter difficulty can easily be overcome by the addition of some preservative to the solution.

In a series of twenty-five consecutive counts we obtained an average of 310,000 plates per c.mm. This is considerably less than that given by Pratt⁴ himself. Individually the counts varied from 170,000 to 440,000.

Various colouring reagents were tried along with Pratt's solution. Of these tried the following showed some affinity for the plates:—methyl green, gentian violet, methylene blue, and aniline blue.

Of these methyl green showed the strongest staining affinity. The outlines and processes of the plates showed up very clearly. The protoplasm had a granular appearance, suggestive of chromatin dots or strands.

In the last ten of the twenty-five counts the solution was coloured with methyl green. The average number of plates per c.mm. in these was 291,000. Although the average with methyl green is somewhat less, the use of the stain undoubtedly leads to greater accuracy, since its use facilitates the differentiation between plates and such other bodies as extruded leucocyte granules, hæmoconia, yeasts, etc.

TABLE OF COUNTS MADE WITH PRATT'S SOLUTION.

	Sex.	Age.	Reds per c.mm.	Plates per c.mm.	Hæmoglobin.
1	M.	32	5,100,000	300,000	105 per cent.
2	M.	19	5,000,000	320,000	95 "
3	M.	33	550,000	360,000	100 "
4	M.	26	5,000,000	350,000	90 "
5	M.	22	5,200,000	330,000	95 "
6	M.	22	5,500,000	370,000	100 "
7	M.	21	5,000,000	400,000	100 "
8	F.	19	4,800,000	440,000	80 "
9	M.	30	5,270,000	195,000	105 "
10	M.	14	4,900,000	320,000	90 "
11	M.	29	5,200,000	170,000	105 "
12	M.	15	5,000,000	380,000	95 "
13	M.	30	5,200,000	200,000	105 "
14	M.	14	4,900,000	410,000	90 "
15	M.	31	5,100,000	320,000	105 "

Average number of plates per c.mm. is 324,000.

PRATT'S SOLUTION TINGED WITH METHYL GREEN.

	Sex.	Age.	Reds per c.mm.	Plates per c.mm.	Hæmoglobin.
16	M.	30	5,100,000	250,000	105 per cent.
17	M.	30	5,200,000	230,000	105 "
18	M.	14	4,900,000	400,000	90 "
19	M.	30	5,100,000	240,000	105 "
20	M.	14	5,000,000	370,000	95 "
21	M.	36	5,500,000	270,000	105 "
22	F.	18	4,800,000	245,000	90 "
23	F.	20	5,000,000	310,000	95 "
24	F.	17	5,000,000	380,000	100 "
25	F.	18	4,900,000	210,000	95 "

Average number of plates per c.mm. is 291,000.

2. *Kemp's Method*.—Kemp's solution is $2\frac{1}{2}$ per cent. formaline in 1 per cent. sodium chloride. The technique carried out was exactly similar to that of Pratt. The plates showed no tendency to clump, and could be clearly differentiated. When methyl green was added to the solution it did not appear to show such a strong affinity to the plates as when added to Pratt's solution.

Ten counts were made. In the last four methyl green was added to the solution.

TABLE.

	Sex.	Age.	Reds per c.mm.	Plates per c.mm.	Hæmoglobin.
1	M.	31	5,200,000	470,000	105 per cent.
2	M.	30	5,100,000	200,000	100 "
3	M.	30	5,100,000	200,000	100 "
4	M.	14	5,000,000	310,000	95 "
5	M.	15	5,000,000	220,000	95 "
6	M.	15	490,000	110,000	95 "
7	F.	18	4,900,000	245,000	95 "
8	M.	14	5,000,000	357,000	98 "
9	M.	31	5,200,000	325,000	105 "
10	F.	17	5,000,000	380,000	100 "

Average number of plates per c.mm. for the ten counts equals 282,000.

3. One or two observations were made using a 1 per cent. solution of osmic acid (van Emden solution⁷). Clumping was prevented, and the plates were well differentiated. The results obtained were very much similar to those obtained when Pratt's or Kemp's solution was employed.

4. *Brodie and Russell's Method*.—A solution composed of equal parts of glycerine saturated with dahlia and 2 per cent. sodium chloride was used. We were unable to get satisfactory counts on account of the tendency for deposits of the stain to settle on the slides.

5. *Deetjen's Method*.—The technique in this method is somewhat different to that of the previous methods. Glass slides are covered with a film of jelly made up as follows:—Agar, 5 grms. boiled in 500 c.c. distilled water for half an hour. To each 100 c.c. of filtrate was added—

- 0.6 gm. . . Sodium chloride.
- 6.8 c.c. . . 10 per cent. watery solution of metaphosphate of sodium (Merck).
- 5.0 c.c. . . 10 per cent. watery solution of potassium bisulphate.

This composition forms a jelly on cooling. The preparation required to be kept in a steriliser (*a*) to prevent decomposition. (*b*) to keep fluid. Slides are immersed in this fluid just prior to use. A small drop of blood is placed on the slide and a cover-slip applied.

Deetjen's observations led him to the conclusion—(*a*) that the plates were nucleated, (*b*) that they were possessed of amoeboid movement. Eight counts were made by this method. They showed an average count of 296,000, varying from 170,000 to 520,000.

TABLE.

	Sex.	Age.	Reds per c.mm.	Plates per c.mm.	Hæmoglobin.
1	M.	31	5,200,000	480,000	105 per cent.
2	M.	31	5,200,000	210,000	105 ..
3	M.	17	5,000,000	330,000	95 ..
4	M.	19	5,600,000	230,000	105 ..
5	M.	20	5,800,000	520,000	105 ..
6	M.	29	5,000,000	179,000	100 ..
7	M.	20	5,000,000	170,000	100 ..
8	M.	31	5,100,000	260,000	105 ..

This method is cumbersome and not well suited to ordinary clinical work. As the plates can be observed unstained the essential point is to prevent clumping. This is achieved by all the methods described.

The results obtained by us are very considerably smaller than those obtained by the majority of observers by the indirect method. It is interesting to note the results of observations made by Ayrnand⁹ by the indirect method in the case of blood drawn directly from a vein.

Five to ten c.c. of blood was drawn into 2 c.c. of a 10 per cent. solution of sodium citrate, and afterwards treated with a diluting solution made up as follows:—

Sodium citrate	10 grms.
Sodium chloride	5 grms.
Distilled water	500 c.c.

To this is added 10 c.c. commercial formaline.

To 2 c.c. of this solution is added as many drops of the citrated blood as will give it a faint rose tint. The dilution is such that the 16 squares of the Thoma-Zeiss counting chamber should contain from 1200 to 1500 reds. The proportion of plates to reds is easily calculated.

In eight subjects of ages varying from 17 to 55 he obtained counts varying from 183,000 to 250,000.

Our observations lead us to recommend the indirect method, and of the various preservative media used Pratt's, Kemp's, and van Emden's solutions were all found suitable. The addition of some methyl green adds to the efficacy of Pratt's solution.

When examining fresh films one is struck by the variation in size of the plates. The plates vary in size from a $\frac{1}{2}$ to 2 or 3 W. The processes of the smaller ones are not so well defined.

We were led to the conclusion that possibly the plates are broken up in many instances. If this be so it explains to some extent the large variation in counts, and also shows the necessity of letting the blood flow freely before using it for observation.

SUMMARY.

1. A comparison of the various methods of enumerating blood-plates has been made.

2. The simplest and most accurate method is to puncture the skin through a drop of a diluting fluid, transfer some of the mixture to a slide, dilute further, if necessary, on the slide. With the aid of a "Retz" eyepiece ascertain the proportion of plates to red blood corpuscles, the latter being previously or subsequently counted.

3. The best available diluting fluids are those of Pratt, Kemp, van Emden. Pratt's solution is greatly improved by the addition of sufficient methyl green to tint it fairly deeply.

4. The number of plates per c.mm. in a normal adult may vary from two to four or five hundred thousand, the average count being about 300,000.

5. Fragmentation of the plates may account to some extent for differences in the results of enumeration of plates.

I am indebted to Dr. Goodall for much helpful criticism in carrying out this research.

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CLINICAL RECORDS

**A CASE OF MULTIPLE OSTEOMATA WITH
SUPERVENING SARCOMA.**

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THROUGH the courtesy of Dr. C. S. Young I had the opportunity a short time ago of examining a widow, aged 84, the subject of multiple osteomata. Her previous health so far as could be ascertained had been good. Her senility rendered her memory not very retentive for comparatively recent events, and her friends were only able to supplement to a slight extent the imperfect history she gave of her present illness. Fully ten years previously the first of the numerous tumours, which later on became so obvious, appeared. It consisted of a painless enlargement on the right side of the lower jaw. Other swellings were not long in following, though she was unable to indicate the order or rapidity of their incidence.

When I saw her she was thin but neither emaciated nor anæmic, and there was no appearance of any cachexia. The striking appearance she then presented is indicated in the accompanying plate. There was a universal bony enlargement of the entire right side of the lower jaw with no sign of softening at any part. On the left side there was a larger exostosis which occupied three-quarters of the horizontal ramus and the body of the jaw. This was a hard bony tumour, prominent enough and well defined if less obvious and more circumscribed than that on the right. Beneath the alveolo-labial sulci these tumours could be felt distinct and well defined when examined from the buccal aspect, and it was obvious that they were tumours and not general enlargements of the jaw. Over the nasal bones, passing to the left and at the outer angle of the left orbit, were two tumours of considerable size but soft and fluctuant, in which osseous elements could not be distinguished. These were of quite recent growth. In the centre of the forehead, above the glabella and left supra-orbital ridge, was a similar soft tumour, also comparatively recent, with a ridge of hypertrophied bone as its base. There was some thickening about the left temporal ridge,



MULTIPLE OSTEOMATA OF FACE ASSUMING SARCOMATOUS DEVELOPMENT.

apparently bony. A tumour of somewhat elastic character, underlaid by thickened bone, occupied the upper part of the manubrium sterni, more especially in the left half.

These various tumours produced a most striking deformity. They seemed to be remarkably free from discomfort and altogether from pain. Dr. Young informed me that some of the tumours had varied in size from time to time, and that there had been one about the right supraciliary region which had attained a considerable size and yet had entirely disappeared. At its maximum it had completely blocked up the right eye, overhanging it and shutting it, so as to entirely obscure its vision. Though the patient was bedridden when I saw her she had not been so for long, but she had not been out of doors for about two years on account of the increasing conspicuousness of the facial deformity.

In life, as in the photograph, the facial aspect suggested at once the condition of multiple osseous tumours or bony thickenings on the face, which Virchow designated *leontiasis ossea*.² The term, however, has not been very happy in its application, and has been applied to a variety of affections which certainly ought not to be classified together. The true form of osseous tumours of the face is typified in Bickersteth's famous case.¹ This patient lived during many years with his deformity, and though the face was the part mainly affected a bony tumour ultimately appeared on one of his tibiae, and in this a sarcomatous element supervened and caused his death. There is a beautiful illustration of the skull in Bickersteth's original paper, and the macerated skull is still in existence. In some cases reported as *leontiasis ossea* there is a thickening of the bones much more diffuse than regular osteomata, and it is on account of this condition that *leontiasis ossea* is defined by some writers as being an osteitis deformans affecting the bones of the face. A number of years ago I pointed out what confusion existed between these various conditions and that curious anomaly known as unilateral hypertrophy. In this communication³ I mentioned that the bones alone were sometimes affected, and it was not necessary that the soft parts should participate. This is merely a clinical subdivision, and is not intended to suggest any difference in etiology or pathology. *Leontiasis ossea*, whether the term be restricted to multiple osteomata occurring on the face or whether it be extended to include a condition simulating osteitis deformans, has this similarity to my case, that it tends in the long run to assume a sarcomatous growth or degeneration. Such a complication does not tend to occur in unilateral hypertrophy, but apart from

the termination the conditions are so dissimilar that one might as well confound the changes of acromegaly with leontiasis ossea or with unilateral hypertrophy. Each condition produces an obvious facial deformity, but they are etiologically distinct.

Multiple osteomata are particularly liable to affect the bones of the face. After prolonged duration other bones become involved, and ultimately there is a peculiar tendency to the supervention of a sarcomatous element in the tumours.

REFERENCES.—¹Bickersteth, *Liverpool Med. Chir. Journ.*, 1857, and *Trans. Path. Soc. Lond.*, vol. xvii. ²Virchow, *Die Krankhaften Geschwülste*, 1863. ³Greig, D. M., "Unilateral Hypertrophy," *Edin. Hosp. Rep.*, 1898, vol. v.

A CASE OF REINFECTION WITH SYPHILIS.

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EXPERIMENTAL evidence has clearly shown that once syphilis is cured there is no immunity against a fresh infection. Neisser and other investigators have found in the case of apes that after the disease has been cured, either by treatment or through the process of spontaneous recovery, the animals are susceptible to reinoculation. These facts are corroborated by the history of the following case, in which the patient was reinfected ten and a half months after receiving an intramuscular injection of salvarsan for the treatment of secondary syphilis:—

History of the First Infection.—Mr. A., age 26, student. The primary sore appeared on 10th October 1910, 4 weeks after exposure to infection. The sore was a typical hard chancre, situated on the inner surface of the prepuce close to the frænum, and was associated with considerable balanitis. A fortnight later a roseolar rash appeared on the trunk, arms, and thighs, and general lymphatic enlargement was noted. At this stage the patient was given mercury, first in the form of pills, and later by inunction. In spite of this treatment, although the primary sore healed, leaving no scar, the secondary symptoms persisted. The rash became more papular and spread to the forehead and scalp, the fauces were congested, and a mucous patch and small ulcer appeared on the edge of the tongue.

On 29th January 1911 0·6 grm. of salvarsan was injected intramuscularly into the gluteal region. A moderate general reaction followed the injection, and the patient thereafter rapidly improved. The mucous patch on the tongue disappeared within four days, and by the end of a week the rash had completely faded and the glands diminished in size. Although the treatment was highly successful the

patient suffered severely from pain at the site of injection, and was lame for a fortnight.

Several months subsequent to this were spent in the country, and during this period I saw him occasionally and was satisfied that there was no recurrence.

History of the Second Infection.—On 8th January 1912 the patient reported himself, again complaining of a venereal sore. This had appeared three and a half weeks after exposure to infection. On examination it presented the characters of a typical hard chancre, about $\frac{1}{2}$ cm. in diameter, slightly smaller than on the previous occasion, and occupying a different situation, being placed mesially on the glans at the attachment of the frænum. The chancre was cartilaginous in consistence and the surface slightly depressed and moist. Its characters were sufficient to make a diagnosis certain under ordinary circumstances, but this was confirmed by finding numerous examples of the spirochæte pallida in films made after scraping the chancre and stained with Chinese ink. Intravenous injection of salvarsan was accordingly recommended at once, but the patient delayed coming for treatment till three weeks later, and by this time a rash had developed, chiefly roseolar, but combined also with a few papules. It was very similar to the secondary eruption in the first infection, but was confined almost entirely to the trunk, although a few spots were present also upon the forehead. The inguinal, epitrochlear, and posterior sterno-mastoid groups of lymph glands were enlarged and shotty. The throat was congested, but no mucous patches were present. The presence of secondary symptoms completed, therefore, the clinical features, and confirmed the diagnosis of a true re-infection. On 1st February 1912 0·6 gm. of salvarsan was injected intravenously. As on the former occasion, a general reaction was not marked, and the symptoms rapidly improved. At the end of a week the rash had entirely disappeared, and the chancre was healed, leaving no induration.

The case demonstrates (1) the cure of syphilis by salvarsan when mercury had failed; (2) the absence of immunity after cure of syphilis; (3) the advantage, from the point of view of the patient's comfort, of the intravenous over the intramuscular method of administration.

A similar case has been recorded by Stühmer* in which reinfection occurred 5 weeks after the injection of salvarsan for the treatment of the first attack of syphilis.

* *Münch. med. Wochenschr.*, 25th April 1911, p. 873.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

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X-RAYS IN DIAGNOSIS.

A NUMBER of authors contribute to a symposium (*Bull. de la Soc. de l'Internat. des Hôp. de Paris*, January 1912) upon the radio-diagnosis of visceral affections in the thorax and abdomen. This forms a most useful synopsis of the opinion of several experts in different branches of what is an important and advancing subject. With regard to the *lung*, Delherm gives three signs which in his opinion are of importance in the recognition of early tuberculosis. These are (1) the diminution of clearness in the pulmonary field, especially in the region of the apex, persisting upon several successive examinations; (2) increase in bulk of the tracheo-bronchial glands is a sign of some value; (3) diminution in amplitude of the movements of the diaphragm (Williams's sign) varies from the 8 or 10 centimetres of excursion which one finds in health, to 4 or 2 centimetres, or even to no movement at all owing to a loss of elasticity in the tissues of the lung that is diseased. Two other points he states to be worthy of remark—one the visible diminution that takes place in the cardiac area early in the course of the disease, the other is the atrophy of the costal cartilages over the lesion which is also brought out by the X-rays. Later in the course of the disease radiography, while not necessary for diagnosis, is a valuable help in studying the distribution, character, contents, etc., of the cavities present. When these are still full of caseous material a darkened area is presented, when they contain air their site is marked by a light patch surrounded generally by a darker ring. Emphysema is associated with special clearness of the pulmonary field and with defective movement of the diaphragm. Hypertrophy of the thymus and the condition of the mediastinal glands as to enlargement can be made out quite well in the adult and still more precisely in the child, thus affording a valuable aid in cases where doubt exists from the ordinary physical examination.

With regard to the *heart*, Lebon gives a fairly comprehensive summary of the appearances to be obtained in the anterior, posterior,

lateral, and oblique views of the chest. As regards the orthodiagraph, an instrument by which the X-ray tube is moved over the surface of the chest in alignment with the eye of the observer looking through a small aperture that moves in correspondence with the axis of the rays, and by which a series of marks is made round the outline of each organ, the writer does not consider the method of great value. He says he has never found two orthodiagrams of the same heart superimposable, owing partly to the movements of the patient, partly to the changes constantly taking place in the size and position of chest, heart, and lungs, with respiration, and partly to the difficulty of following the heart all through in a single phase of its own proper movement.

For the *œsophagus*, Aubourg places the patient in the right anterior oblique position, and one then sees this tube as a clear space between the vertebral and cardio-aortic shadows. Normally, a milk of bismuth requires 1 or 2 seconds only to pass down, and shows well the sinuous course of the *œsophagus* together with its points of narrowing. He draws attention to several important points regarding the *stomach*. For instance he recalls the fact that when loaded with a fluid meal the stomach resembles a *j* in shape, and its lowest part reaches to the iliac crest in the majority of cases when the patient is in the standing position. Not only the greater curvature but the pylorus rises and falls as the person lies or stands, the movement of the latter being much less, however, than that of the former, and amounting to about the width of one vertebral body. The stomach of the supine patient in fact bears no relation to that of the patient standing, for in the recumbent position the greater curvature generally rises above the level of the pylorus, so that the stomach has the form of a large comma, of which three-fourths lie behind the costal arches. This shows that, clinically, the only parts of the stomach capable of palpation are the pylorus, prepyloric region, and lowest fourth or so of the body of the organ; it shows also that valuable information may be obtained by palpating the stomach in the erect posture when much more of it is exposed, and when the change of position of nodules or points of tenderness demonstrates these to be situated in the wall of the stomach itself. It is obvious that we must modify our conceptions as to the nature of ptosis and dilatation for these reasons. Further, there is an important point in treatment that arises out of this mutability in the stomach. If we are to attempt the treatment of gastropptosis or dilatation by means of belts and corsets, they should be applied on the principle that one follows in putting elastic bandages upon the legs for varicose veins, viz. they should be put on while the patient is horizontal and then they retain the organ in suitable position when he stands up. The time required for evacuation of the stomach contents into the duodenum has been most variously

given, and this depends largely upon the fact that some radiologists give the patients a milk of bismuth, others a bismuth porridge. The former is passed into the duodenum in $1\frac{1}{2}$ to 3 hours, while the latter remains in the stomach for $2\frac{1}{2}$ to 5 hours in quite normal conditions of this organ. In cases where the operation of gastro-jejunosomy has been performed the X-rays allow of a study of the functioning capacity of the new opening. If there exists a stenosis of the pylorus the milk of bismuth passes directly out by the new opening, often so rapidly in small quantities that the stomach is emptied in 5 to 15 minutes. In other cases the pylorus is seen still to afford passage to the stomach contents, and in some cases both the openings continue to discharge the function. *The small intestine* is quickly passed, from $1\frac{1}{2}$ to 5 hours only being required, according to Grodel, before a meal of milk of bismuth has passed the ileocaecal valve. *The large intestine* is best studied by means of a bismuth enema consisting of a suspension of bismuth in ordinary water or gum water to the amount of one litre. This rises remarkably quickly in the large intestine, and, according to Aubourg, such an enema reaches the caecum in less than one minute after it has been introduced, thus allowing a study of the entire course of the large intestine with the patient in the dorsal position.

The question of *early diagnosis in tuberculosis of the lungs* is statistically considered by Levy-Dorn (*Berl. klin. Wochenschr.*, 1911, No. 4). While agreeing with most other writers on the subject that the X-ray photograph or shadow is not to be trusted to entirely for the diagnosis of phthisis, he holds as the result of a wide experience that this is a most valuable adjuvant measure in doubtful cases. In children the bronchial glands, if enlarged, are easily made out, and so a suspicion of tuberculosis is established, while in adults the condition of the apex is generally readily diagnosed; thus in only $12\frac{1}{2}$ per cent. of cases that were doubtful tuberculosis of the lung from a clinical point of view was no help given by an X-ray examination, while in all his other cases Levy-Dorn found that the latter method was of great value; in $12\frac{1}{2}$ per cent. establishing the diagnosis, in 28 per cent. making it sure when clinically there was some doubt, and in 47 per cent. confirming or amplifying the clinical findings. Rieder (*Fortschr. auf. d. Geb. d. Röntgenstrahlen*, Bd. xvi. H. 1) has found that the X-ray examination is of great help in the secondary affections of pulmonary tuberculosis; for example, the presence of effusion in the pleural cavity is indicated by a shadow filling up the costo-diaphragmatic angle and by the obscuring of the movements of the diaphragm, while its amount may also be roughly gauged. In cases where the fluid is of considerable amount a characteristic cross-shadow is seen, due to effusion between the lobes. Also the occurrence of acute miliary tuberculosis is sometimes recognisable as a fine diffuse marbling of the lung when clinically

the case has been taken for one of influenza or typhoid fever; for example, Achelis met with several such cases, and Rosenbaum (*New York Med. Journ.*, v. 93, No. 24) records one in which this condition had been clinically diagnosed as a slight bronchitis and in which no tubercle bacilli were discoverable in the sputum. Riedel discovered that cavities in early tuberculosis are much commoner than is generally supposed.

X-RAYS IN TREATMENT OF TUBERCULOSIS.

As regards the treatment of tuberculous conditions the X-ray method has again come to enjoy considerable favour. For lupus this method has for many years taken the chief place along with the Finsen light, but recently its application has been greatly extended to other parts of the body than the skin. Wilms is said by Fraenkel (*Berl. klin. Wochenschr.*, 4th March 1912) to have been the first to apply the X-rays to the larynx with success. A man of 30 years with apical tuberculosis, an abscess of the neck, and a tuberculous ulcer occupying the interarytenoid region, after a few deep applications was healed of the two last-named lesions. Schulz also recorded several successful cases in some of which application of the rays had been made partly through the skin and partly direct to the mucous membrane; in one such case of a tuberculous tumour affecting the whole epiglottis the condition was cured after eight séances. In cases of bone and joint tuberculosis Wilms (*Deutsch. med. Wochenschr.*, 1910, No. 6) had obtained excellent results by a combination of surgical procedure and X-ray applications; and at the Basel clinic Iselin had in the same class of cases obtained rapid and complete recoveries in twenty-four out of forty-one cases treated (*Zeitschr. f. Chir.*, 1910, Bd. ciii.). While there is little room for other methods in the treatment of tuberculous cervical glands, seeing that surgical intervention in bad cases is so thorough and successful, yet there arise instances in which it is desired to combine expectant treatment with something less radical than removal. In these cases numerous workers recommend the X-rays as particularly useful, and Kienböck collects these results in an article in the *Röntgentaschenbuch* for 1911. Immediate diminution in size of the glandular masses is often observable, sinuses heal up, and as tuberculous granulations are specially amenable to the X-rays the closure takes place in their entire length, and finally the resulting scars are less marked. Several writers believe that the processes set up in tuberculous glands by the rays have the effect of producing antibodies which heighten the immunity of other organs to the attack of the bacillus.

Fraenkel (*Therapie d. Gegenwart*, December 1911) records several cases of favourable influence exerted by this method of treatment in

tuberculous peritonitis. In all there was a general improvement of health and increase in weight, fistulae closed, and tuberculous infiltrations disappeared. Späth (*Deutsch. med. Wochenschr.*, 1911, No. 16) also records a case of far advanced abdominal tuberculosis with great infiltration of the pelvic cellular tissues and an intestinal fistula in which, as a last resort, exposure to the X-rays was tried; the result was surprising, for after eighteen applications the wound healed, the infiltration had disappeared, and the general condition was immensely improved. Späth also gives statistics of a combination of operation and X-ray application, as a result of which 43 per cent. of cases treated for tuberculous peritonitis were cured and 31 per cent. improved.

With regard to this form of treatment for tuberculosis of the urinary tract there seems to be little success, though Späth in the paper quoted mentions two cases of kidney tuberculosis successfully treated by another writer. With regard to pulmonary tuberculosis, also, there seems so far to be little to record in the matter of success.

Fraenkel (*Berl. klin. Wochenschr.*, 1911, No. 17) discusses the general value, as regards tuberculosis, of applying the X-rays to the region of the ovaries; he regards this as an important measure in prophylaxis.

SURGERY.

By D. P. D. WILKIE, F.R.C.S.,
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SURGERY OF THE THYMUS.

UNTIL quite recent years the thymus gland had attracted comparatively little attention from surgeons. This was not unnatural, considering that its function was so obscure, its lifetime so short, and its position so secluded. The association of a persistent thymus with sudden death under anæsthesia, whilst demanding the attention of the surgeon, did not tend to attract him to this gland as a field for surgical enterprise. The work of the past few years, however, has shown that not only is the thymus readily accessible and easily removed, but also that its removal in certain conditions is followed by very gratifying results.

The experiments of Basch (*Wien. klin. Wochenschr.*, Bd. xvi. p. 3), and especially those of Klose and Vogt (*Beitr. z. klin. Chir.*, Bd. lxxix. p. 1), have shown that the thymus is essential to the life and development of young animals, and that if it be removed sufficiently early (tenth day of life) a very definite cycle of changes supervenes, which culminates in the death of the animal. For the first two to four weeks after removal of the gland no change is seen (latent stage), then the

animal becomes unduly fat and lethargic (adipose stage lasting till the third month), thereafter comes the stage of cachexia and idiocy, lasting from the third till the fourteenth month, the animal finally dying in a state of coma. The bones of such animals are soft and break readily, and in the same animal there may be the signs of rickets, osteomalacia, and osteoporosis.

Complete removal of the thymus in a child is therefore inadmissible. Klose has shown that the thymus possesses extraordinary regenerative powers, and that if a fragment of it be left it will grow to practically the normal size of the gland. Undue enlargement of the thymus in young infants may give rise to numerous pressure effects, of which tracheal compression causing stridor is the most frequent. Hochsinger (*Wien. klin. Wochenschr.*, Nos. 45-47, 1903) by X-ray examination has definitely shown that in most cases of congenital stridor the thymus is unduly large, and Jackson (*Journ. of Amer. Med. Assoc.*, 1907, No. 21) by bronchoscopic examination has demonstrated the flattening out of the trachea by an enlarged thymus. Rehn (*Arch. f. klin. Chir.*, Bd. lxxx), in 1896, was the first to operate on the thymus in a case of congenital stridor. Olivier (*Arch. gén. de Chir.*, Feb. 1912) has collected the records of 42 cases of thymectomy for this condition, and he considers that surgical interference should be the routine treatment for such cases.

The operations performed for hypertrophied thymus are three in number—(1) exothymopexy; (2) resection of the manubrium sterni; (3) thymectomy.

In exothymopexy the thymus is pulled up through an incision in the suprasternal region and fixed by sutures to the sterno-mastoid muscles, so that it lies in the lower part of the neck. This operation sometimes fails to give relief, and has little to recommend it. Resection of the manubrium sterni, with or without removal of a portion of thymus, has been uniformly unsuccessful. The operation which has been attended by most success is that of subcapsular thymectomy through a suprasternal incision. Veau (*Presse méd.*, 1910, No. 29) has clearly shown that such a thymectomy is always subtotal, and that in a human being a complete thymectomy through a suprasternal incision is impossible. The capsule of the thymus is formed of deep fascia which has such extensive connections with and relations to important structures as to make an extra-capsular thymectomy impossible. The thymus is separated from its capsule by loose fibrous tissue, and can be very readily shelled out; indeed if the capsule be incised the gland will sometimes be delivered into the wound by the respiratory movements alone.

Subcapsular Thymectomy.—A vertical incision is made in the suprasternal region, extending for three-quarters of an inch down over the front of the manubrium; the deep fascia is incised and the depressor muscles

of the hyoid retracted to either side. Another layer of deep fascia now presents, and must be divided. When this is done the space in front of the trachea is exposed, and the thymus, enclosed in its fascial capsule, is seen moving up and down with respiration. Its upper pole is caught up by forceps and the capsule incised, when the gland itself is projected through the opening with each inspiration. The left lobe is first pulled up, a catgut ligature applied to its pedicle, and the lobe removed; the right lobe may then be similarly excised. The wound in the neck should be closed without drainage. Olivier advocates general anæsthesia for this operation, and believes that chloroform, if administered with care, is the best anæsthetic for these cases. All writers remark on the simplicity of this operation, and the short time required for its performance, fifteen minutes being usually sufficient. Olivier has collected from the literature forty-two cases of thymectomy in young children, with twenty-seven recoveries and fifteen deaths. Of the fifteen fatal cases only two were straightforward cases of sub-capsular thymectomy. In the other fatal cases either a resection of the sternum had been carried out, or a tracheotomy performed with consecutive infection of the mediastinal wound, or there was concomitant enlargement of the mediastinal lymphatic glands. In the cases which survived operation the results were most satisfactory, and in 70 per cent. the dyspnoea from which the infants previously suffered disappeared altogether. The most striking results were obtained in the cases in which there had been in addition to dyspnoea repeated crises of suffocation, an immediate and lasting cure being obtained in 80 per cent. of these cases.

Apart from respiratory troubles children with hypertrophy of the thymus gland suffer from symptoms of a general intoxication—status thymicus—and for this condition thymectomy may be indicated. Tisserand records the case of twins, one a bright, healthy child, the other pale, fat, and flabby, with dull eyes and no vivacity. A hypertrophied thymus was diagnosed and thymectomy performed. Five months later the child was quite transformed, being bright and intelligent and in excellent physical condition. Veau has recorded similar cases.

Thymectomy for Exophthalmic Goitre.—Svehla has shown that an extract of the thymus gland has the same influence on the heart as has that of the thyroid gland, namely, an acceleration of the pulse and a lowering of blood-pressure. Capelle (*Beitr. z. klin. Chir.*, Bd. 72), from a large series of post-mortems on cases of exophthalmic goitre, found that the thymus was persistent and hypertrophied in a large proportion of cases. Of those cases of Graves' disease which had died from the disease itself the thymus was enlarged in 82 per cent., whilst of cases which had died from heart failure after thyroidectomy 95 per cent. had hypertrophy of the thymus. Hart has shown that it is just in the most severe cases of exophthalmic goitre, with pronounced cardio-

vascular symptoms, that thymic enlargement is found. By transplanting the thymus from cases of thymic death into the abdomen of dogs Bircher (*Centralbl. f. Chir.*, No. 70, 1912) has succeeded in producing typical exophthalmic goitre in these animals. Acting on these data Garré, in a case of exophthalmic goitre with cardiac disturbance, performed the operation of thymectomy and left the thyroid alone. The result was extremely satisfactory, in that the patient's general condition immediately improved, the pulse-rate gradually fell from 140 to 100, and the blood picture returned to normal; the goitre and the exophthalmos, however, remained as before. These facts serve to show that in exophthalmic goitre both thyroid and thymus glands may be at fault, and they would appear to indicate a further development in the surgical treatment of that disease.

SPOROTRICHOSIS OF BONE.

Lesieur and Marchand (*Lyon Chir.*, February 1912) record a case of sporotrichotic infection of the tibia, and give notes of the two previously recorded cases of this disease in bone. In all three cases the subjects were old people of 71, 60, and 80 years respectively. The bones affected were the tibia in two cases and the radius in the third. The disease appeared to be primary in the bone, the infection being blood-borne, the organism having gained access probably from the mouth. In two of the cases the disease was associated with fracture, but in neither case could it be determined clearly whether the fracture was of the pathological type or whether the disease settled down secondarily at the site of fracture.

The differential diagnosis from tubercle and syphilis of bone is very difficult, and can only be decided by making cultures. In one case there was a hypertrophic osteitis of the bone, in the second a definite destructive osteomyelitis, and in the third a localised intra-osseous abscess. Treatment with potassium iodide was followed by immediate improvement in all three cases.

SURGICAL TREATMENT FOR PARALYSIS AGITANS.

Leriche (*Lyon Chir.*, March 1912) records a case of advanced paralysis agitans in which section of several posterior nerve roots was followed by gratifying results. In this disease besides the tremor there is always considerable rigidity of the muscles, and the patients frequently complain of an incessant feeling of irritation in the affected parts. Leriche believes that the hypertonicity of the muscles is the result of these constant centripetal impulses, and that therefore section of the corresponding nerve roots, as advocated by Foerster, should lessen the muscular rigidity.

In a patient, aged 57, who had suffered for many years from this malady he divided the sixth and seventh cervical nerve roots on the right side and the sixth root on the left side. The patient pronounced himself greatly benefited by the operation; the pains in the arms which had formerly been his chief complaint disappeared, the tremor was considerably lessened, but the muscular rigidity was not greatly influenced. Leriche proposes in this case to divide the second, third, and fifth lumbar roots on each side, and in addition to perform neurectomy of several intercostal nerves, abdominal pains being a feature in the case.

DISEASES OF CHILDREN.

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THE question of *latent tuberculosis in childhood* and its recrudescence into more active and clinically recognisable forms is discussed by Sluka (*Wien. klin. Wochenschr.*, 1912, 259) from several points of view, but especially from that of diagnosis at an early stage in the process of reactivation. He deals exclusively with lung tuberculosis, which is the prevailing type in Vienna, both in children and adults, while abdominal tuberculosis is relatively uncommon. He sketches as follows the pathogenesis of the common clinical type: The primary infection is somewhere in the tissue of the lung, and is carried there by the air-passages. This primary focus may become progressive, as commonly happens in infants, and then disseminates a general and rapidly fatal tuberculosis; or it may become retrogressive, as frequently is the case in older children, and in this event forms a caseous area of healed tubercle. In the latter group the sequence of events is followed further. This primary healed or retrogressive focus has nearly always infected the neighbouring lymphatic glands at the pulmonary root; these glands play the decisive rôle in subsequent events, for they form a barrier to the further spread of the tuberculous process which is often a complete and permanent one, but which again may be ineffective and allow a second infection of the lung now on a larger scale.

It is necessary to remember that this picture of events, while true for Vienna, may not be applicable elsewhere; but in Vienna it is securely based on two sets of statistical investigation—on post-mortem findings in a large number of children dying from all causes, where the extraordinary frequency of pulmonary tuberculous lesions of this character was shown, and on large masses of clinical data, accumulated by Hamburger, v. Pirquet, and others, showing that 90 per cent. of poor children in Vienna from ten years upwards, while clinically non-

tuberculous, gave a positive tuberculin skin reaction. From the above post-mortem data it may be presumed that the majority of these children have a tuberculous infiltration of the glands at the root of the lung.

Under unfavourable conditions of life an activation of the disease in these glands may easily occur and a secondary invasion of the lung take place. At this critical stage an early recognition of what is occurring is all-important, and yet can seldom be obtained by the ordinary clinical tests. The child has grown thin and pale, is easily tired, has lost appetite, and in sleep is restless and may then appear flushed and perspiring; but on physical examination of the lungs the only abnormal finding may be a few rhonchi which are of no diagnostic importance. It is in this clinical group, showing very definite general symptoms of some infective process but no local signs, that Sluka has found value in thoracic skiagraphy. In these cases it was common to find areas of shadowing impinging on the cardiac dulness to right or left, though this was much commoner on the right side. Here these assumed two common types, as branching processes extending outwards, or as a triangular area based on the heart, with its apex projected laterally. Where the shadow was dense and sharply defined it was presumed that the disease was circumscribed to the root glands; where it was lighter and with irregular faint edges an involvement of the lung was supposed. But in many cases it was impossible to make the distinction. In each case the thorax was skiagraphed every fourteen days, and often it was possible to note after some time an extension or contraction of the shadow, this change coinciding with a change for the worse or the better in the condition of the child. It was observed that in some cases where this progressive infiltration of the lung was taking place physical examination of the chest was still negative when the X-ray picture showed a marked extension of the shadow area.

The question of whether this tuberculous infiltration of the lung is a fresh infection or a reinfection from the old focus is next discussed. Experimental evidence on this point shows that reinfection is only secured in animals by much more massive doses than were sufficient to cause a primary infection. This result is due to the degree of immunity established by the first infection. Sluka considers it doubtful whether it is possible to get a second infection in sufficient mass and concentration to produce a successful lodgment of the bacilli in the tissues. In consumption health resorts, where the poor children, already in large proportion suffering from a primary but healed infection, have abundant opportunity of reinfection, the statistics of death-rates show that such reinfection rarely takes place. It is therefore probable that this tuberculous invasion of the lung is due to the spread outwards of the disease hitherto sealed in the glands of the pulmonary root,

and that this spread is due to the erosion either of a bronchus or a blood-vessel. Sluka points out that this infiltration of the lung, which is generally fatal, is a relatively uncommon event, while latent tuberculous disease of the pulmonary root glands is an extremely common one. He conjectures that the occurrence of this grave secondary phase is due to a greater severity of primary infection in those cases, and by inquiry has found that more than half of his cases showed long and close contact with severe cases of phthisis (E. Sluka, *Wien. klin. Wochenschr.*, 15th February 1912).

The Scaphoid Form of Scapula, its Significance.—Graves (*Journ. Amer. Med. Assoc.*, 1910, lv. 12) was the first to draw attention to a deviation from the normal type of scapula which he terms the scaphoid scapula, and whose recognition he has claimed to be of value as an index of general degenerative changes. He regards it as always a congenital defect, and, so far as he knows, produced only by syphilis in the parents.

The scaphoid scapula is described by him as follows: The vertebral border is concave or scaphoid (the normal contour being convex), or if the deformity is less marked the border may be straight. There is lengthening of the long axis of the scapula. Both vertebral borders of the scapula tend to become parallel to each other and to the spinal column. The spine of the scapula forms almost a right angle with the vertebral border. Buds and tuberosities are more common than usual on the vertebral border, which also is thin and lacks the intermediate border and lips. The two scapulæ may differ from each other in size, shape, etc.

The main characteristic, however, is the concave or scaphoid form of the vertebral border, and it is one by which this type of scapula lends itself fairly easily to clinical recognition.

The scaphoid scapula, according to Graves, is much more frequent in individuals below the average both physically and mentally. Individuals with this type of scapula often show a long series of degenerative changes. Various structural defects are fairly common, but mental and physical disorders are also often present. As children they are undersized (though sometimes again tending to giantism), with soft muscles and a lowered resistance to disease. They are apt to be intellectually eager, and are often sexually precocious. In adolescence they often develop various psycho-neuroses, epilepsy, neurasthenia, hysteria, dementia præcox. Tuberculosis is rife among them. They often show no definite stigmata of congenital syphilis. Certain functional and physical disorders accompany this configuration of the shoulder-blade so frequently as to be termed by Graves correlations. These correlations are nocturnal enuresis, catarrhal inflammations in the throat, bronchi, and alimentary tract, adenoids, palpable enlargement of the lymph nodes at the root of the neck, asymmetrical

pupils, and certain vasculo-sclerotic changes. To the latter the author devotes considerable attention. They consist of tortuosities, thickenings and dilatations on the small subconjunctival vessels, and are detected by the use of the binocular corneal microscope; to the unaided eye they give a glazed, fixed look to the patient, and are described by Graves as varnished sclera. These vascular changes normally develop from about the 35th year, but in children showing the scaphoid scapula are commonly present by the 10th year, and even sometimes as early as the 4th year. At the same time the larger arteries may show corresponding degenerative changes, and the radial artery is often palpably thickened.

Graves categorically states that no post-natal cause can produce the scaphoid scapula and its correlations. It is always due to some degenerative factor in one or both parents, and up till the present he has been unable to find any other cause than syphilis. It can be transmitted for several generations, but then tends to disappear.

Kellner (*Deutsch. med. Wochenschr.*, 1911, No. 2) examined 126 insane persons for the scaphoid scapula. It was present in 86, that is 68 per cent., but in different groups its frequency varied. Thus in 50 idiots, incapable of work, it was present in 49, while in 50 feeble-minded patients, who carried out active muscular work, it was only present in 22. This suggested to Kellner that the scaphoid form of the scapula might be due to imperfect development of the muscles attached to the vertebral border. As a control he examined 30 of the asylum attendants, and found it present in 1, and that a very neurasthenic individual. Kellner differed from Graves as to the preponderating rôle played by syphilis in the ascendants, for out of 260 Wassermann tests on the inmates only 18 were positive, and these were known cases of congenital syphilis. Graves, however, maintained that the syphilitic factor might operate through several generations of descendants.

V. Kollert (*Wien. klin. Wochenschr.*, 1911, 1299) in a careful investigation of 250 clinical cases and 114 skeletons gives a general assent to Graves' conclusions. In no case of congenital or maternal syphilis was the scaphoid scapula absent, but he did not find that the severity of the deformity corresponded with the severity of the syphilitic infection. He quotes interesting cases of the scaphoid scapula associated with congenital absence of the trapezius muscle and with Sprengel shoulder.

Reye (*Zeitschr. f. d. Erforsch. d. jugendl. Schwachsinn.*, 1912, Bd. v. p. 395) in a recent article submits important results on the lines of Graves' observations. He imposes a severer test than any hitherto employed, for he only accepts a scapula as scaphoid where, on bringing both shoulders forward, the convexity of the vertebral border is not only palpable but also visible. With this standard he has collected 52 cases, all of which are therefore marked and indubitable examples

of the scaphoid scapula. The age incidence of his cases was as follows :—

Age-Period.	No. of Cases.
1-10 years	9
10-20 „	27
20-30 „	7
30-40 „	4
40-50 „	3
50-56 „	2

The condition was thus relatively uncommon in adults, as compared with children and adolescents. No special influence of sex could be traced.

Of the 52 cases syphilis was established in the ascendants in 26 instances. In this group were 5 cases showing definite stigmata of congenital syphilis, and in these the scapular deformity was extreme. But again Reye has noted marked cases of congenital syphilis where the scaphoid scapula was absent, an observation which is opposed to the statement of v. Kollert on this matter.

In the remaining half of the cases syphilis could not be traced in the parents. Every possible method of investigation was used, including the Wassermann test. This group therefore seems to leave room for other factors than syphilis as causal agents. In 13 cases there was a marked history of alcoholism in the parents; in 6 cases there was tuberculosis; and in 5 cases severe nervous disease in one or other parent. Two cases remained where the family history was entirely free from flaw; in these both children had suffered from severe brain disease early in life—in each case an encephalitis—and Reye believes, in opposition to the view of Graves, that in rare cases such as these a post-natal cause may produce the scaphoid scapula.

Reye entirely confirms the frequent association of the other physical and physiological defects termed correlations by Graves, and he agrees that they must be regarded as evidence of a general physical and mental deterioration of which the scaphoid scapula is an important and easily recognised stigma.

DR. CHAS. McNEIL requests us to publish the following note:—"In my paper on the above subject in the April number of this *Journal* it was stated that for Edinburgh no post-mortem statistics as to the nature and distribution of tuberculous lesions were available. Since the article appeared I have learned that Dr. Shennan carefully analysed the post-mortem records of the Royal Edinburgh Hospital for Sick Children from 1883 to 1904 in reference to this very question, and I much regret that I was unacquainted with his paper (which was published in the *Lancet* for 30th January 1909) and did not therefore refer to it in my article."

DERMATOLOGY.

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and

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HYPERKERATOTIC SKIN ERUPTIONS DUE TO GONORRHOEA.

BUSCHKE divides the eruption in gonorrhœa into four groups—(1) A simple erythema ; (2) urticaria and erythema nodosum ; (3) hæmorrhagic and bullous eruptions ; and (4) hyperkeratoses. Arning and Meyer-Delius (*Archiv. f. Derm. and Syph.*, 1911, p. 3) have recently thrown some more light on the last group of cases. Out of 4300 cases of gonorrhœa in males a hyperkeratotic eruption was seen in twenty, and out of 550 cases in females no such complication was ever seen. This eruption occurred most frequently on the penis, less frequently on the feet and hands, and rarely on other parts of the body. The eruption begins as a vesicle, situated in the Malpighian layer of the skin. This does not burst ; it dries up and leads to the formation of a round clear horny lesion, sometimes with a distinct red ring round it. The most typical lesions are seen on the soles and sides of the feet. The lesion remains stationary as long as the general gonococcal infection lasts, and disappears as soon as the infection is cured. The soles of the feet may also show a diffuse hyperkeratotic condition in addition to the rounded lesions described. The lesions on the hands are similar, although of much rarer occurrence. The penis shows a characteristic balanitis circinata. This differs from the ordinary balanitis erosina circinata in not spreading but remaining stationary after fully developed. The glans penis and adjacent foreskin are the seat of a circinate eruption, with hyperkeratotic masses as on the feet. This horny material only forms where the patient has been circumcised or keeps the foreskin retracted ; in the other cases it is less marked, the surface of the lesion being covered with a greyish-yellow sodden mass, which differs from that found in the ordinary balanitis in not showing the presence of any organisms.

These hyperkeratotic eruptions only occur in cases of gonorrhœa in which there is a general infection associated with gonococcal arthritis and endogenous conjunctivitis. The cause of the eruption is doubtful. Gonococci have never been found in the skin lesions. There is also no proof that it is due to the toxins of the gonococcus. Want of cleanliness cannot be held responsible, as in some of the cases the eruption appeared whilst under treatment in hospital. In most cases the

eruption appeared very shortly after the joints became affected. Attempts were made to infect other parts of the skin from the lesions on the penis but with negative result. No treatment for the skin is required, as the eruption disappears with the cure of the general condition.

INVESTIGATION OF VIRUSES OBTAINED FROM CASES OF LUPUS VULGARIS.

The Final Report of the Royal Commission on Human and Animal Tuberculosis (vol. ii. of part ii., Appendix) contains an investigation by A. Stanley Griffith of viruses obtained from cases of lupus vulgaris. The cultures of tubercle bacilli were obtained from patches of lupus excised from the skin, either by direct cultivation from the macerated skin lesions or from guinea-pigs which were inoculated from that material. The cultures showed considerable variations in their properties. Twenty viruses were investigated and only 3 yielded cultures which were identical both in cultural character and virulence with one or other of the two types of mammalian tubercle bacilli. Of these 3 cultures one was typically "bovine" and 2 typically "human". Of the remaining 17 viruses 8 grew like bovine tubercle bacilli and 9 like the human tubercle bacillus, but none of these showed the virulence which is characteristic of bacilli with such cultural characters. The properties, cultural characters, and virulence of the bacilli isolated from the lupus tissue do not appear to have any relation to the age of the patient or to the duration of the lupus. In order to ascertain whether the low virulence of these atypical viruses was stable or not experiments were performed to see whether they increased in virulence after passage through animals. Of the 8 "bovine" cultures in 2 cases the virulence was increased up to the normal standard of a bovine virus. The virulence of the other viruses (with the exception of one, which showed a slight increase of virulence) was stable, no change taking place from repeated passage of them through the calf. But although passage failed to raise the virulence of these viruses, judging from their cultural characters and their effects on inoculation into calves and rabbits, they are bovine viruses which have become degraded in virulence. Of the 9 "human" cultures 4 were tested after a single residence in the animal body. The virulence of 3 of these remained unaltered, whilst the virulence of one was apparently increased. Apart from the decisive proof of identity with the human tubercle bacillus, which an increase to standard virulence as the result of animal passage would have given, the original properties of these viruses sufficiently indicate their close relationship with the human bacillus. The effects produced in susceptible animals only differ from those produced by standard human bacilli in their lesser severity.

Investigations were then made to try to find out whether the

attenuation of the lupus bacilli was antecedent or subsequent to entry into the individual affected with lupus. It may be taken for granted that the bacilli were not attenuated before infection of the patient, as no similar cultures were obtained from many cases of tuberculosis of man and animals. Therefore the attenuation must take place in the human body. In no case of human tuberculosis were such attenuated bacilli obtained from tuberculous lesions of any of the internal organs; therefore the influences favouring the change must be resident in the skin. In order to see whether the bacilli diminished in virulence by longer residence in the skin, cultures were again made from some of the same patients as before several months after the first investigation; but the longer residence of the bacilli in the skin had not caused any diminution of their virulence or alteration in their cultural characters. Though there is no direct proof that bacilli lose virulence when resident in the skin, the fact of their attenuation and the absence of similar varieties in animal and in other kinds of human tuberculosis strongly favour the view that it is in the cutaneous tissues of the lupus patients that the degradation in virulence takes place. The results of inoculation of animals also reveal nothing which would support the view that these attenuated cultures are intermediate or transitional stages of transformation from bovine into human tubercle bacilli. Griffith considers that these attenuated bovine bacilli do not stand in any closer relation to the attenuated human bacilli than do the normal bovine bacilli to the normal human bacilli.

THE CULTIVATION OF THE SPIROCHÆTA PALLIDA.

Noguchi (*Journ. Exper. Med.*, 1st January 1912, p. 90) has now succeeded in cultivating the spirochæta pallida directly from syphilitic lesions in man. He had previously cultivated that organism from the testicular lesions of rabbits inoculated from human lesions. But it is much more difficult to cultivate the spirochæte direct from the human lesions, because of the other numerous contaminating organisms. Two conditions are important—(1) strict anaerobiosis, and (2) the property which the spirochætes have of migrating in the solid medium in which they are multiplying. Noguchi uses a solid medium consisting of two parts of a 2 per cent. slightly alkaline agar and one part of ascitic or hydrocele fluid, at the bottom of which a fragment of sterile tissue, *e.g.* rabbit kidney or testicle, is placed. The tissue acts chiefly by removing the traces of oxygen from the lower levels of the medium, and probably also by providing a special form of nutriment. The spirochætes will not grow unless a piece of such tissue is present. The medium is placed in long test-tubes, the sterile piece of tissue lying at the bottom. After solidification a layer of sterile paraffin oil is added to prevent evaporation. The material used for making

cultures was obtained from lesions rich in spirochaetes, such as chancre, condyloma, or skin papule. The tissue is placed in sterile salt solution containing 1 per cent. sod. citrate, it is then cut up into fragments and some of it emulsified in a mortar and proved microscopically to contain spirochaetes. Pieces of the spirochaete-containing tissue are pushed by means of a thin blunt-glass rod to the bottom of the tube of medium, and several drops of the emulsified tissue are also introduced into each tube by a capillary pipette. The tubes are incubated at 37° C. for two or three weeks. The medium becomes diffusely opalescent, with an opaque growth of bacteria along the stab-canal. Spirochaetes are present with many other bacteria. Subcultures are made from these impure cultures and incubated for 2 or 3 weeks at 37° C. Along the stab-canal a dense mass of bacteria grow, but the spirochaetes grow out into the medium and cause a hazy appearance. These tubes are broken across the centre and a fresh subculture made from the hazy peripheral growth without touching the central canal, and so a pure culture of spirochaetes is obtained. The growth, when pure, is just faintly visible, and is most marked near the fragment of sterile tissue. In such cultures the spirochaetes are very motile, show typical curves, and also flagellæ at the ends. The method of division of the spirochaetes was studied under the dark-field microscope, and the author observed that the spirochaetes divide longitudinally, the whole process taking about two hours.

Inoculation of the pure cultures into the skin of two species of lower monkeys was followed by the production of lesions resembling the primary syphilitic lesion in man and those caused in the monkey by inoculation of spirochaete-containing tissue. During the course of the positive inoculation in the monkey the blood develops a positive Wassermann reaction.

A CUTANEOUS REACTION IN SYPHILIS.

Noguchi (*Journ. Exper. Med.*, December 1911, p. 557) has attempted to obtain a specific cutaneous reaction which might be used as an aid to diagnosis in syphilis. A pure culture of the spirochaeta pallida was taken, and, after dilution, heated to 60° C. for 60 minutes and then 0·5 per cent. carbolic acid added. When examined microscopically the spirochaetes were found to be dead and cultures made remained sterile; the material also, when injected into the testicles of rabbits, produced no lesion. Noguchi has given the name "luetin" to this substance. A substance of the same composition as luetin but without spirochaetes was used as control. The luetin or control substance is injected intradermically with a fine needle, 0·5 c.c. being the amount used. Before applying it to human beings tests were made with rabbits. Normal rabbits, rabbits suffering from acute syphilitic orchitis, and

rabbits cured of a syphilitic orchitis 4 months previously by salvarsan gave no reaction; but rabbits repeatedly inoculated into the testicles with either living or killed spirochætæ pallidæ gave a well-marked inflammatory reaction. The reaction was then tested on human beings. In normal individuals a slight reaction after 24 to 48 hours, with the formation of a small papule, may be seen, but it soon disappears, and is not followed by induration. According to the manner and intensity of the reaction Noguchi distinguishes 3 varieties of reaction—(1) Papular form—lasting several days, with induration and redness around. This form is seen usually in cases of secondary syphilis under regular mercurial treatment in which there are no manifest skin lesions; cases of congenital syphilis also show the reaction. (2) Pustular form—at first papular, then vesicular, and later pustular; a crust forms but almost no scar is left. This is the form seen in tertiary syphilis, also in secondary or hereditary syphilis treated by salvarsan. (3) Torpid form—a small pustular reaction appears late on—10 days or later. This form was seen in a case of primary syphilis, one of hereditary syphilis, and in two cases of secondary syphilis, all being under mercurial treatment. As a rule there is no general effect. In a few cases general malaise, loss of appetite, and diarrhœa were noticed. The luetin produces the most constant and severe reaction in tertiary (100 per cent.) and hereditary affections (96 per cent.). During the primary and secondary stages it is infrequent, and when present is of mild degree. An exception, however, is found in cases in which energetic treatment has been or is being carried out, and in which clinical signs of syphilis are absent. Such cases may show a severe reaction. This is especially true of cases treated with salvarsan. In certain cases of old infection in which no treatment has been taken and in which no symptoms have appeared for many years, and in the course of which no miscarriages have occurred, the cutaneous reaction has failed to appear; but in spite of the absence of symptoms, mothers who have young syphilitic children have usually given the reaction. This reaction will probably be useful to supplement the Wassermann reaction in determining the complete and permanent cure of a syphilitic infection. It appears probable that the Wassermann reaction is more constant in primary and secondary syphilis and the cutaneous reaction in the tertiary and latent forms of the disease. It also appears that the Wassermann reaction is more directly and immediately affected by antisyphilitic treatment than is the cutaneous reaction.

INFECTIOUS DISEASES.

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ERYTHEMA IN THE COURSE OF INFECTIOUS DISEASES.

HUTINEL (*La Presse Méd.*, 13th March 1912) writes an interesting paper on this subject. He refers especially to the erythema which occasionally supervenes in the course of enteric fever, and which, in his experience, is often associated with a certain group of severe symptoms. The erythema itself is usually polymorphous in character, assuming a resemblance to both measles and scarlatina in different parts of the body. The sites most favoured are the knees, elbows, wrists, and ankles, and, above all, the buttocks and the face. The eruption is not accompanied by itching, and is followed by more or less desquamation. This type of rash is, of course, seen not infrequently in enteric fever and in the course of the other acute infectious conditions.

Hutinel, however, regards it merely as a single element in a symptom-complex, of which the other signs are vomiting, diarrhoea, a retracted abdomen, a choleraic facies, and a low pulse tension. The temperature tends to fall rather than rise, and the appearance of the symptoms has sometimes suggested the occurrence of a perforation. There is in all cases a profound asthenia and well-marked wasting. So far as enteric fever is concerned, Hutinel has observed what might be described as an epidemic of this symptom-complex, 13 out of 36 patients being affected, and no less than 6, or nearly half, succumbing. He apparently regards it as identical with the erythema which complicates severe cases of septic scarlatina, which is occasionally observed in broncho-pneumonia following measles, which was recognised in diphtheria before the days of serum sickness, and which may be seen in acute intestinal inflammations and colitis.

The rash, in other words, is merely one symptom of a general condition, probably an infection depending upon streptococci or other micro-organisms. It is, of course, important to exclude the possibility of drug rashes. In discussing the pathology of the condition Hutinel lays stress upon the fact that in all his autopsies he has found the liver enlarged and fatty and the suprarenal glands increased in size and weight. Both medulla and cortex are affected, but the latter suffers most and may show areas of necrosis. In some instances both the thyroid and pancreas were also diseased. He believes these changes may be due to the direct action of micro-organisms or their toxins as in the case of diphtheria, and that the micro-organism con-

cerned may be either that which is responsible for the original illness or one which has become imported secondarily.

Roger considered the changes in the liver as being most important in the causation of the symptoms given above, but Hutinel agrees with Ribadeau Dumas and Harvier that the subacute inflammation of the suprarenal glands is in reality the cause. In favour of this view he describes the symptoms of a boy recently treated by him whose symptoms were much ameliorated by the administration of adrenalin, and recurred when the drug was withdrawn, only to disappear entirely shortly after its resumption.

It may be remarked that rashes of the type described often occur in the course of enteric fever, unaccompanied by any of the serious symptoms detailed above. Hutinel's paper, however, will doubtless lead to a careful examination of the suprarenal bodies in fatal cases of septic scarlatina as well as in typhoid.

THE OPHTHALMO-REACTION IN TYPHOID FEVER.

When Chantemesse in 1907 adapted the principle already laid down for tuberculosis by Calmette, and devised a method of obtaining an ophthalmic diagnostic reaction for enteric fever, hopes were raised that the general practitioner would have placed in his hands an easy method of recognising that fever. Subsequent observations, however, published by various authors, did not tend entirely to confirm the value of the test, which, it was asserted, might be positive in normal persons, was not invariably present in enteric fever, and occasionally caused too strong a reaction. Austrian (*Johns Hopkins Hosp. Bull.*, January 1912) has made a careful investigation of this method of diagnosis, and the results which he has obtained are worthy of attention. In preparing the antigen which is to cause the reaction he has slightly modified the procedure of Chantemesse. A large number of flasks of bouillon were inoculated with no less than 80 strains of typhoid bacilli, Austrian considering that failures to obtain reactions depend upon the fact that the strains infecting the patient may be sufficiently dissimilar from those used in preparing the antigen to nullify the test. He instances Durham's theory of the causation of relapse in fevers as a point in favour of this view. The typhoid cultures were centrifugalised and washed, and an emulsion made in sterile distilled water. This, after being exposed to 60° C. for two hours, was dried *in vacuo*. The desiccated culture was then ground in an agate mortar with crystals of sodium chloride for three hours, sterile water being added drop by drop. The resulting emulsion was then warmed for two hours at 60°, and this heating was repeated for half an hour on three successive days. Thereafter the supernatant fluid was slowly poured into ten volumes of absolute alcohol and the white flocculi formed were dried

in vacuo. The residue was ground to a powder, and one drop of the solution of ten milligrams of it in one cubic centimetre of water was used for each test.

Austrian, after employing the reaction in 75 cases of enteric fever and in 190 persons either normal or suffering from other diseases, arrived at the following conclusions:—A solution of one-third to one-half of a milligram of “typho-protein” in a drop of water, when instilled into the conjunctival sac of a patient ill with typhoid fever, causes a typical inflammatory reaction. The most constant results are obtained when the “protein” is derived from numerous different strains of the bacilli. The typical response shows definite characteristics, being limited to, or maximal in, the palpebral conjunctiva of the lower lid and in the caruncle. It appears in from one to five hours, reaches its maximum intensity in about six hours, and persists twenty-four hours or longer. Its most characteristic sign is the deep purple congestion of the caruncle and lower lid. The response produced in other conditions is different, being shorter in duration, showing less congestion in the caruncle, and tending to affect the bulbar conjunctiva, while purulent inflammation is more common. The results of the test closely correspond with those of blood cultures, and the reaction is of greater assistance than that of Widal in early diagnosis. Austrian regards the phenomenon as anaphylactic in character, considering the patient as sensitised by his own micro-organisms. He thinks that the reactions obtained in normal persons, different as they are from the specific one, depend similarly upon the sensitisation of the individual by colon bacilli, which are so closely allied to those of typhoid. In proof of these views he cites interesting experiments showing that guinea-pigs sensitised by intra-peritoneal injections of “typho-protein” can be fatally intoxicated by a post-orbital injection of colon protein and *vice versa*.

The reader of Austrian's complete paper will be impressed with the accuracy of the test. Unfortunately an aqueous solution of the protein does not keep well, and the reaction cannot readily become popular if a fresh solution has to be made for each test. No doubt this difficulty will be overcome, in which case it is probable that in the ophthalmo-reaction of Chantemesse we will have the simplest method of accurately diagnosing enteric fever.

PATHOLOGY OF WHOOPING-COUGH.

Döbeli (*Corr.-Bl. f. Schweiz. Aerzte*, 1912, No. 4) gives expression to somewhat revolutionary views concerning whooping-cough. He considers that, so far, no micro-organism has been isolated which can be absolutely proved to be the cause of the disease, which he nevertheless admits to be communicable and to confer immunity for the future after

a single attack. He says that children can develop whooping-cough without having been brought in contact with anyone suffering from the illness. Whooping paroxysms appear if the nervous system of the child is over-excitabile, and are severe in direct proportion to the excess of excitability. The infection is due to the catarrh which invariably accompanies pertussis, and which can be caused by all sorts of bacteria being communicated from child to child. To develop whooping, however, a child must have heard, and probably also seen, paroxysms in another patient, and this kind of infection is psychical. (It may here be not unfairly remarked that this last suggestion is in flat contradiction with Döbeli's first conclusion that a child may develop whooping-cough without having been in contact with one suffering from the disease.) The immunity is explained as a psychical immunity, the patient having developed sufficient will-power to prevent a repetition of similar attacks in future.

It is not easy to regard these conclusions very seriously, the more so as there is nothing in Döbeli's paper which can be said in any way to prove them. It is a well-known fact that the highly infectious prodromal stage of pertussis may last as long as six weeks. It is extremely difficult to assert, therefore, that a patient suffering from the disease has not been in contact with an affected child. As for the statement that it is necessary for a child to hear another whoop before developing the paroxysms, the records of every children's hospital will furnish scores of instances to the contrary. The infecting case is often some weeks in the wards before commencing to whoop.

These facts and others are discussed adequately by Feer (*Corr.-Bl. f. Schweiz. Aerzte*, 1912, No. 6) in a reply to Döbeli's contribution. In the first place he obviously considers, as many of us do, that the bacillus of Bordet and Gengou, if not the proved cause of pertussis, should be regarded seriously. He thinks there is no proof at all that any sort of bacterial infection of the respiratory passages can assume the characteristics of whooping-cough. It is quite true, however, that such conditions may in certain children produce symptoms of laryngismus which it may be difficult to distinguish from pertussis. Such children, however, are not found to be infectious to others in hospital wards. On the other hand, if by any chance a child in the prodromal stage gets by accident into a ward and remains there even a single day such an importation is often followed by a small ward epidemic of the disease. That infection is most to be feared at this early stage of the illness, before the development of the whoop, is strongly against the importance of "psychical infection." Deaf mutes, moreover, are liable to pertussis, and surely psychical influence can play little or no part in impressing the young infants who form such a large proportion of our patients. The immunity from a second attack so universally observed is the strongest argument in favour of the specific nature of pertussis.

The explanation of Döbeli that the immunity is psychical appears overstrained. It is still less satisfactory when we remember that in psychical infections, such as hysteria, there is no such immunity developed as the result of restraint, but on the contrary relapses are common. Again, why should children affected with whooping-cough let themselves be deprived of their sleep at night by the paroxysms, and even go so far as to die as the result of them?

MENTAL DISEASES.

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THE PATHOGENESIS OF A DELUSION.

THE author (H. Devin, *Journ. Ment. Sci.*, July 1911) is of the opinion that there has been in the past a tendency to regard classification as the ultimate aim of psychiatry; the case being labelled, investigation is complete. The patient's point of view or the personal significance of his abnormal ideas and reactions are not studied. He affirms that the case is not one of a group but an entity in itself, no two cases of insanity being alike. The insane are to be regarded as types of mental variation rather than as beings entirely removed from the normal. The thoughts and actions of the sane and the delusions and impulses of the insane represent reaction to experience. Abnormal mental processes cannot be regarded as accidental and insignificant, but must have definite antecedents.

He cites the case of a woman whose malady apparently originated in an indefinite malaise, a feeling of "being different," and then goes on to show how the antecedent state of mind requires to be studied in order to account for the morbid idea expressed by her that she was a source of infection and the cause of illness in others. He briefly summarises the main thesis of Freud that morbid mental phenomena arise primarily out of certain states of mental conflict—experience out of harmony with the aspirations of the personality. Freud's laborious and complicated technique of psycho-analysis he believes can be considerably assisted by the employment of Jung's association experiments. Among these is the method of calling out a word to the patient and noting the time he takes to pronounce the first word which it suggests to his mind. A list of such words and the reply is kept and the experiment repeated. Considerable variation from the normal is noticed on account of emotion and mental distraction in the length of the reaction time, alteration in the character of the response, and failure to reply with the same word. In a test of 50 words, and after

methodical interrogation of the patient, when the response was delayed or the reply a word not directly associated, the author elicited the circumstance that underlying the delusion of being infectious was a complex giving rise to feelings of shame, loss of self-esteem and unworthiness, which pointed to the existence of some moral injury—some actual experience of a painful nature which preceded the onset of the psychosis. A further analysis of groups of words of amatory significance resulted in a reticence and evasion on the part of the patient with a display of tearful emotion pointing to repression from a desire to preserve a secret. Under further examination the patient was found to be ashamed of her supposed lack of modesty on a specific occasion, and in consequence believed herself unworthy of her friends and not fit to be a teacher and guide to children. Obsessed with this idea she began to feel ill because unable to give attention to her duties. The story of an erring girl who had contracted an infectious disease kept recurring in her mind till she believed herself to be similarly affected. Overweighted by this horror she sought explanation for her condition in other physical causes (“transference”), the painful effect thus becoming divorced from the ideas with which it was formerly associated in an attempt to divert the mind from the original incompatible experience. As the patient was not stupidly prudish and accused herself of wickedness on inadequate grounds a deeper complex must be sought to explain her attitude. He succeeded after a prolonged inquiry in getting behind the defensive ideas of unworthiness, and discovered that this concealed complex arose from her decision to remain unmarried on account of the occurrence of insanity in both of her parents. Thus the intra-psychic conflict was determined—the conflict between natural desire for marriage and a repugnance from conscientious motives. The solution of such a conflict, says the author, may be attained by the patient in various ways. Adjustment in some form must occur, the particular reaction depending on the type of mental organisation. Stronger individuals, keeping clearly before them their determination to remain single, divert their energies into other channels—ambition, self-sacrifice, devotion to others, etc. Weaker personalities, especially those inheriting an unstable mental constitution, will tend to solve the conflict by taking refuge in evasion which may be so far removed from reality as to constitute a psychosis. This patient had continued her affection for her friend after telling him of her heredity, and suppressed her determination to remain single. The ideal ceased to exert a conscious influence, and found no normal expression, though bound to persist unconsciously and ultimately to manifest itself in some indirect and distorted fashion. She became tormented with feelings of depression and unrest, since she was acting in opposition to her original decision, which she had striven to banish from her mind. She invented reasons to account for her state of mind. She

now believed herself wicked, immoral, etc., and unfit to associate with others. Thus a delusion is elaborated to make her marriage impossible, and she fails to adapt herself to reality, being, indeed, in a state of resistance towards the real.

The author argues that as the mechanism became clear to the investigator it was possible to lead the patient back to the real issue of her life, and so enable her to appreciate her true condition and thus accomplish her re-education. It is only by retracing the steps by which the patient has evaded reality and helping her to understand her own mind that satisfactory results can be obtained. He maintains that insanity is a matter of personality, dependent on purely individual factors, wishes, aspirations, and secret conflicts. In this case there is not merely a variety of melancholia but a personality the victim of an unstable ancestry and her own ideals.

EPILEPSY.

In a short paper (*Rev. Neur. and Psych.*, October 1911) of inquiry into the family history of 154 epileptic children Dr. A. Hume Griffiths elicited a percentage of 40 and 37 respectively of phthisis and epilepsy. He finds himself unable to confirm the opinion of Dr. Aldren Turner that the dominant predisposing cause of epilepsy is ancestral epilepsy, or that tubercle does not seem to stand in any relation other than through the debilitating influence which its co-existence with epilepsy entails.

With regard to the administration of bromides in epilepsy Louis Casamajor (*Journ. Nerv. and Ment. Dis.*, xxxviii., No. 6) thinks it unbelievable that more cases of bromism do not occur than is generally recognised. He suggests that there may be a physiological intolerance, and that serious symptoms may arise in such cases from even small doses. He further believes that cases of so-called alcoholic delirium are really suffering from bromide intoxication, as these patients are usually treated with bromide mixtures. In such patients the bromide fails in its sedative action, and they often die without local cause discernible post-mortem, except perhaps a condition of "alcoholic wet brain." Although he would appear to admit the existence of damaged heart and kidneys, he maintains that "bromide delirium" replaces the alcoholic, which it so closely resembles (Hoch). He would caution the physician, therefore, to watch for the early signs of poisoning — thick-tongued speech, "bromide breath" and mental dulness. When these symptoms appear the drug should be discontinued and replaced by large doses of sodium chloride combined with vigorous eliminative treatment.

From a very careful investigation into the question of deviation of complement in cases of epilepsy Dr. G. H. Garnett (*Journ. Ment. Sci.*,

October 1911) has produced much suggestive matter. He found that the serum of epileptics contains some substance of the nature of a specific antibody, and that the urine very generally contains a substance in its turn specific to the antibody in the serum. He believes that it may yet be possible to extract toxins from the urine of epileptics which could be employed as a vaccine in the treatment of their disease. Dr. Moore Alexander's elaborate experiments to test various hypothesis (*Lancet*, 14th October 1911), consisting of the production of epilepsy in animals, the presence of agglutinins and opsonins in the blood of epileptics for bacillus coli, the chemistry of intestinal putrefaction and its relation to putrefactive organisms in the faeces, resulted in negative information, except that he determined that there would appear to be a low ureo-ammonia ratio associated with epilepsy. Still more recently colloid substances have been found to be present in the urine of certain varieties of insanity which are toxic to animals; that of general paralysis during epileptiform seizures and also of epileptics are found to produce convulsions and death.

PERSONAL EQUATION IN ALIENISM.

An exceedingly interesting paper (*Journ. Ment. Sci.*, October 1911) in which Dr. Drapes challenges various psychological theories and expresses his views with the avowed intention of provoking controversy. He is unwilling to accept many of the more modern views of psychiatrists in relation to the classification of mental diseases. He treats his subject with regard to the personal equation of both the observer and the observed. He suggests that, as opinions widely differ as to the etiology and treatment of disease in general medicine, there is bound to be a still greater conflict of opinion obtaining in a department of medicine, where the subject-matter is hidden from view and so elusive and where too often opinion is little better than conjecture. Undaunted however, and while asserting that the question "What is mind?" will probably remain unanswered to the end of time, he proceeds to propound still further theory to show what it may be. He tells us, physicists after all deal with phenomena of various forces of nature in so-called gravitation, heat, light, electricity, etc., but they know nothing of what these forces really are—their effect only is known. These various forms of energy are invisible, intangible, immaterial, and in essence unknowable. The hypothesis meantime is that they are different forms of motion. In psychic processes the theories of dualism and parallelism admit of no intermixture of the psychical with the physical, but he would point out that there is really no such dividing line anywhere in Nature. Why not consider mind "the highest force in Nature" in dignity and in achieving results? Psychiatry, he says, has become a recognised department of medical science and has progressed in consequence.

Should not our ideas as regards normal mentality be capable of a similar transformation? Modern scientific thought regards all kinds of force as merely modifications of one single force operating under different conditions—only one element and all the others apparently distinct bodies but variants. The atomic theory has given place to the corpuscular, a corpuscle being $\frac{1}{10,000}$ th part of that of a hydrogen atom with a velocity of 10,000 to 90,000 miles a second. Kelvin urged that molecules are vortex rings or points of motion in a universal frictionless fluid (the ether), the difference in mass and property of one atom from another being merely a difference in speed of rotation. The motion is electric and the corpuscles unit charges of negative electricity—electrons. Mass is simply the ether carried along by the corpuscle in its motion, and its amount depends upon the velocity of the corpuscle's motion. Atoms of matter themselves are made up of the same negative charges or corpuscles, each aggregation of corpuscles being surrounded by a sphere of positive electricity. Consequently matter in its last analysis is identical with electricity. Matter is electricity and nothing but electricity, *i.e.* matter is motion, and thus the gulf between the material and the immaterial is bridged over—the two become fused. It is conceivable, therefore, that mind is after all a mode of motion, and mind is matter. Some thinkers shrink from this degrading conception of mind, and thus the theory of parallelism has been propounded, and is that most accepted by leading authorities. Not a theory (or explanation of fact) but merely a truism, a platitude, since it only asserts that all mental processes are accompanied by, but not produced by, not dependent upon the functioning of, the highest cerebral centres.

The theory of evolution formerly applied to the organic world has now been extended to the inorganic substances. For example iron exists in the sun only in primitive forms of matter capable of withstanding the terrific heat (Lockyer). The 80 elements in this world to-day have resulted from a stupendous evolution of inorganic matter beside which organic evolution is the affair of a day, a mere appendix. Evolution of living things is not parallel to, but the continuation and end of, inorganic evolution. The great law of continuity forbids us to assume that life suddenly made its appearance out of nothing, and tells us that we must look for the elements of life in the very elements of matter, for the potentiality of life should exist in every atom (Professor Duncan). The same reasoning may be legitimately applied to the case of mind, otherwise mind will be the one exception to the whole course of evolution. The incarnation of the invisible and immaterial in tangible and visible form is a conception appertaining to more than one theology, and is the very basis and groundwork of the Christian philosophy. Matter is thus the incarnation of energy—spiritual or physical, both immaterial—a view which the theologian cannot

accept, who yet teaches that God is in everything! Here indeed the theologian and scientist meet, and here they might lay the foundation of an armistice if not of fully consummated peace. No longer a bitter variance but a mutual conciliation . . . which would lead to a nobler conception of the universe, the cosmos, than either had as yet entertained—one grand unity manifesting itself in myriad and multitudinous forms, be it called matter, energy, life, unknowable nature, God.

In taking up the question of the personal equation in reference to the subject of classification he says, all agree that classification is necessary, but none are agreed as to a basis. Hence a veritable medley most embarrassing to the student of psychiatry has been manufactured. In an apt illustration of his own view as to the unity of insanity as a malady, he compares the system of grouping based on symptomatology to the shifting coloured schemes of a kaleidoscope, the materials of which remain the same but capable of infinite rearrangement to form a new picture by mere rotation of the instrument. For example he criticises the theory of dementia præcox, which he asserts has not really been proven to be a disease entity, since the principle of the doctrine is unsound. The cases are grouped, he says, because they show a few common symptoms although differing widely in other respects in their mental state. He quotes the essence of Clouston's objection in his term, "because the differences exceed the likenesses," and he refers also to the astounding differences of estimated percentage of dementia præcox in various asylums. Batches of patients presenting similar symptoms could be sorted out, but which particular symptoms were to be regarded of primary and which of secondary importance for classification entirely depends on the mental bias of the observer. Manic-depressive insanity, again, he regards as merely a new term to include cases of mixed insanity—a large class, as pointed out by Batty Tuke, in which "it is impossible to say whether they are melancholic maniacs or maniacal melancholics." Drapes believes that the majority of chronic cases of acquired insanity can be so described, but they cannot be shown to follow any definite course or present special traits to warrant them being regarded as a distinct variety. Kraepelin's work, however, he acknowledges has served to draw attention to the fact.

He next deals with classification with regard to the personal equation of the observed. The inherent mental constitution of the patient gives rise to diverse results in different cases, although subjected to the same disturbing agent. The difference in molecular arrangement of cortical tissues hereditarily developed or modified in function by environment and habit, combined with the varied physico-chemical processes of metabolism, are some of the conditions to account for the variations. The varying results of alcohol on different individuals are cited, and a most interesting reference is made to the

observations of Dr. Lyons of Dublin on the diverse effects of chloroform on the soldiers of the various nationalities in the Crimea—cause and surroundings the same, but individual brains essentially different—a matter of toxin resistance peculiar to each type of cerebral cortex. Again in “traumatic” insanity the cause has little or no effect in determining the special characters of the mental symptoms. He cannot agree that puerperal insanity is diagnosable as such, neither will he allow that phthisical, rheumatic, or syphilitic insanities have characteristic mental features. His reference to the well-known phenomenon of delirium occurring in certain neurotic subjects suffering from one of the fevers would rather suggest that in cases of insanity the mental symptoms are not the disease entity, which instead must be sought for in physical signs apart from these. No matter what mental symptoms, in terms of his peculiar cerebral constitution (by no means readily discernible), a man may show subsequent to imbibing alcohol or inhaling an anæsthetic, he nevertheless can logically and certainly from the point of view of withdrawal or of combating their untoward effects be said to suffer from alcoholic or chloroform toxæmia. The symptoms are as much a result of a specific poisoning as of a particular brain constitution—no toxæmia no mental reaction. That various causes may produce the same kind of mental symptoms is surely no ground for the author to denounce the value of an etiological classification. To cherish a belief that ultimate perfect knowledge of pathological processes would be of no service in framing a scientific classification which would materially aid in diagnosis is no argument, but merely an attitude of antagonism to matters of discovery. Other observers are just as entitled, or even more so, to indulge in a hope that the time may come when all mental disorders can be shown to have a physical or pathological basis, and that as removal of the cause is the first and universal principle of cure a nomenclature which would indicate the underlying morbid physical state is bound to assert itself in the department of psychiatric medicine. Until the pathological processes that precede morbid mental states are accurately determined, however, it certainly is a great advantage in the management of a case of disordered mental action to recognise that there are undoubtedly certain types or varieties, as shown by similarity, of emotional, intellectual, and volitional disturbance. That the terminology is overburdened and that there is a multiplication of so-called varieties of insanity outside practical limits may, however, be conceded.

Although a study of the “unknowable” by methods of analogy, assumption, and conjecture may be excellent intellectual gymnastics, it is scarcely likely to advance our knowledge for the practice of psychiatry. Dr. John Macpherson in the discussion which followed the reading of the paper, said that a controversy of half a century ago, which he had thought to be dead, had been revived. He did not consider that the physician in the specialty need concern himself with

any theory of mind whatever in connection with the treatment of his patients. Materialism was a side issue for the metaphysician and the theologian, etc. In his presidential address to the Medico-Psychological Association a year ago he ably summed up the position thus:—"It is open to anyone to formulate any theory he pleases regarding the psyche; with such theories I have no concern. My object has been to show that there is a gap in our knowledge which may never be bridged, and at the same time to urge that our obvious duty as psychiatrists is to work our laborious way up to the edge of our side of this gap by means of the ordinary methods of investigation; there is sufficient to occupy all our energies in this task for many long years."

NEW BOOKS.

The Modern Treatment of Alcoholism and Drug Narcotism. By C. A. M^YBRIDE, M.D., L.R.C.P.&S. (Edin.). Pp. 376. London: Rebman, Ltd. Price 6s.

IN his preface the author informs us that he has a dual purpose in view—to appeal to the lay as well as the professional reader. This method is seldom successful, and the book before us is no exception. A book written partly for the public, as this avowedly is, is not the most suitable place for minute descriptions of treatment, or for discussions upon the different methods of treatment.

The book opens with a short account of the pathological effects of alcohol. This is followed by a chapter on the causes, and another on the forms of inebriety, including drug inebriety. The chief chapter, however, is upon treatment.

The author's main plea is for the hypodermic strychnine and atropine treatment, combined with chinchona, capsicum, etc., by the mouth, but whether or not the latter is essential is not made clear from the text. We are glad to see that the author believes in selecting his cases, for we believe that much of the adverse criticism upon the method has been due to its indiscriminate use. Only general statements of results are given, but this is not a matter for surprise, as it is notoriously difficult to get reliable after-histories of these cases. The author indulges in too much condemnation, apart from criticism, of other institutions and methods, and there is too much special pleading for the institution in which he is interested.

We do not recognise, from the author's descriptions, any of the homes we know. The impressions which the author gives of some institutions must either have been formed years ago or else the Government Inspectors are ignorant of the abuses mentioned, for if

these are still existent the Inspectors' attention should be drawn to them, and a strict inquiry made.

The book concludes with a short account of the treatment of the various drug inebrieties, with special reference to opium. Mention is made of several methods for the treatment of morphinism, but the author's method of choice seems to be the medium course of a fairly rapid withdrawal of the drug, assisted in the final stages by complete bromidism. We should like to have had the author's reasons for preferring his method in all cases to gradual withdrawal, which can often be accomplished with the minimum of suffering to the patient. No mention is made of the danger of oedema of the lungs from hyperbromidism, and we miss any account of the use of dionine. We are interested to see the author's favourable opinion of combretum sandiacum, as previous reports on this drug have been most contradictory.

Scientific Features of Modern Medicine. By FREDERIC S. LEE, Ph.D.
Pp. vi. 183. New York: The Columbia University Press;
London: Henry Frowde. 1911. Price 6s. 6d. net.

To write a satisfactory book on scientific medicine for lay readers is not easy, yet we think that Dr. Lee may fairly consider that in these Jesup Lectures he has scored a great success. In eight chapters he gives a clear up-to-date review of the present position of medical science, with sufficient allusion to the history of the subject to show the stages through which our knowledge has grown. If anything can lessen the ignorance of physiology and pathology, and the appalling superstitions as to disease, which are just now literally rampant among certain sections (and these not the least instructed) of the community, it is the educative influence of such books as this. We therefore hope that the lectures will be widely read: they deserve it.

An International System of Ophthalmic Practice. Edited by WALTER L. PYLE, A.M., M.D. *Pathology and Bacteriology.* By E. TREACHER COLLINS, F.R.C.S., and M. STEPHEN MAYOU, F.R.C.S. Pp. 558. Three Coloured Plates, and 237 Figures in the Text. London: Rebman, Ltd. 1911. Price 21s. net.

THIS is an important work on the pathology of the eye by two specialists who have already contributed largely to the literature of the subject. The book is arranged on new principles, diseases of the eye being classified and described under 7 headings as follows:—(1) Aberrations in Development; (2) Neoplasms; (3) Derangements in Circulating Fluids and Vessels; (4) Injuries; (5) Inflammations; (6) Parasitic Disease; (7) Degenerations.

The regional method of description is thus set aside and an etiological method of classification, more or less imperfect, is substituted. While this method is naturally fitted for the discussion of certain groups of pathological conditions, *e.g.* developmental defects, we are convinced that, in the present state of our knowledge, it has serious disadvantages. The descriptions of diseases "wide as the poles asunder" are apt to follow each other on the same page or in contiguous paragraphs, and the reader may find himself transferred with disconcerting suddenness from optic neuritis to inflammation of the lachrymal gland. Apart from the question of arrangement, the book appears to us to give a very trustworthy and lucid account of eye pathology. The illustrations are for the most part well chosen and well reproduced. There is a useful appendix on practical methods, such as mounting specimens, cutting sections, staining, etc. ; but surely it is quite out of place in a book of this kind to describe a method of preparing vaccines, or to give a detailed account of the Wassermann reaction.

The book is one we can cordially recommend to the attention of ophthalmic surgeons and to graduates preparing for a higher examination in ophthalmology.

Blood-Vessel Surgery and its Applications. By CHARLES C. GUTHRIE, M.D., Ph.D., Professor of Physiology, University of Pittsburg. Pp. 360. 158 Illustrations. London: Edward Arnold. 1912. Price 14s. net.

IN this volume of the International Medical Monographs Professor Guthrie has summarised the literature on the recent developments of the surgery of the blood-vessels and has brought within reasonable compass the results of a vast amount of his own research work. The result is a comprehensive and authoritative presentment of the present-day position of one of the most advanced branches of modern surgery.

In co-operation with Carrel the author has done a great deal to place the surgery of the blood-vessels on a scientific basis, and while it can scarcely be claimed that the subject has yet passed from the laboratory to the clinical stage, the work described in the volume before us is full of suggestion and promise.

On the experience gained in such laboratory experiments as Guthrie and his fellow-workers have brought to such a high degree of excellence the technique to be adopted in the surgical operating theatre will certainly be founded, and even if it may be long ere the surgeon attempts to transplant a kidney from one person to another, or to replace an amputated limb, it is something to the good that these procedures have been proved to be feasible in animals. Already human surgery has been advanced by these and similar researches—

witness the improved methods now at our command in dealing with injured blood-vessels and with aneurysms. The prevention of threatened gangrene by reversal of the peripheral circulation is now within the range of practical politics, and the transplantation of bones and joint structures has been successfully accomplished. These advances must all be credited to such pioneer work as that of Guthrie, Carrel, and other laboratory investigators.

We welcome this masterly exposition of a difficult and complicated subject, and commend it to the attention of surgeons and physiologists.

NEW EDITIONS.

Diseases of Infancy and Childhood. By L. EMMET HOLT, M.D., assisted by JOHN HOWLAND, M.D. Sixth Edition. Pp. xix., 1112. New York: D. Appleton & Co. 1911. 25s. net.

THE first edition of Dr. Holt's admirable text-book appeared about fifteen years ago, and at once took a leading place among works on diseases of children. Since that time the number of books on the same subject has enormously increased, and it says much for the permanent value of Dr. Holt's work that its popularity has continued, because up till the present time the book has never been thoroughly revised. In the new edition, however, this blemish has been removed. Dr. Howland is now associated with Dr. Holt, and will, we are told, act in future as joint author. Although, as we have said, revision has been very complete, the features which have always made the book valuable remain unimpaired, viz. the numerous original facts and clinical observations collected by so acute and exact a clinician as Dr. Holt. Much new matter has been added to a number of the chapters, among them those on infant feeding, pyloric stenosis, cerebro-spinal meningitis and poliomyelitis. In the chapters on infant feeding and malnutrition some prominence is now given to the work of Finkelstein, to the caloric value of foods, and other work which derives from Europe. As the authors justly observe, neither a percentage "method" nor a caloric "method" of feeding exists; both are simply ways of stating food composition or food requirements. What the food requirements and what the most suitable composition of food in bad cases of malnutrition is a problem as far from solution as ever. The treatment of pyloric stenosis is a question of great interest; the authors take up the moderate position that medical measures are indicated in most cases, —surgical only if vomiting continues. This edition is a great improvement on all the earlier re-issues; the revision which it has undergone should give the book a renewed lease of life.

The Practice of Medicine. By FREDERICK TAYLOR, M.D., F.R.C.P.
London: J. & A. Churchill. 1911.

THIS book is now in its ninth edition. From the time of its first appearance, more than twenty years ago, it has always been a great favourite with students and practitioners. It is eminently suitable as an introduction to larger works on medicine, and can be recommended to students, as it is not overburdened with theories, but deals under each disease only with such points as are known with certainty. In the present edition many new articles have been added on subjects which recent observations have cleared up: among them are enterospasm, Hirschsprung's disease, intermittent claudication, bacilluria, etc. New illustrations also have been introduced, but more would add to the value of the volume, as, for example, in diseases of the blood.

NOTES ON BOOKS.

Physiology of the Human Labyrinth (W. Heffer & Sons, price 2s.). In this little book Mr. Sidney Scott gives an account of the anatomy of the inner ear and of the physiology as far as we know it at present. Mr. Scott does not lay claim to have done a large amount of original work, but he has arranged that of others in a clear and intelligible manner, and has given a good historical account of the investigations on which our present knowledge of the labyrinth is based. There can be little doubt that we are far from a complete knowledge of the inner ear, and it is to be hoped that it may soon be possible to give a simpler exposition of the subject.

The second edition of Mr. Charles R. Whitaker's *Essentials of Surface Anatomy* (J. & A. Churchill, price 3s. 6d.) has been improved by the addition of a few illustrations, but there is still room for more. The facts of surface anatomy are briefly and clearly described, and the book should prove useful to students desiring rapidly to revise this subject.

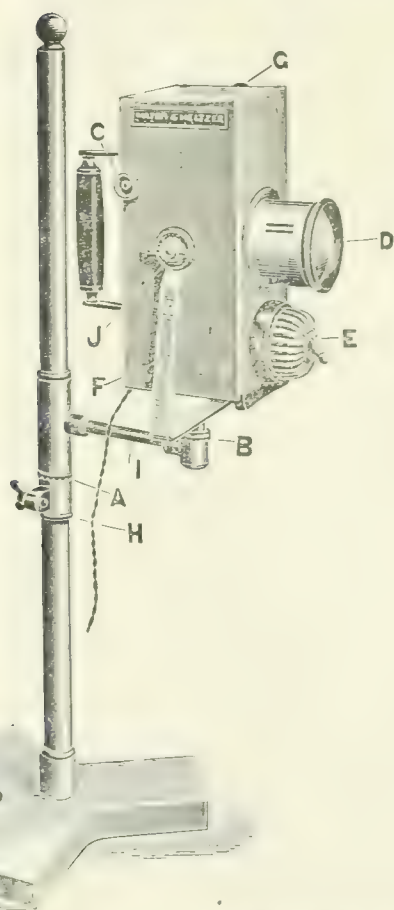
Minor and Emergency Surgery, by W. T. Danureuther, M.D. (W. B. Saunders Co.), is intended for young house-surgeons. It deals chiefly with injuries, sepsis, and fractures, but minor operations and the treatment of shock and collapse, as well as other practical subjects, are discussed. The first chapter is devoted to the young ambulance surgeon, and includes a long list of "don'ts," such as, to quote one example, "Don't invite your friends to ride on the ambulance. It is not a pleasure vehicle." Such writing does not bias the reviewer in favour of a work, and further perusal does little to induce us to recommend this book.

Warwick & Tunstall's *First Aid to the Injured and Sick* (John Wright & Sons, price 1s.) has established its position as one of the best books of its kind, and the seventh edition now published will fully maintain its reputation. _____

Materia Medica Step by Step, by Arthur W. Nunn (Churchill, price 3s. 6d.), is a simple little work designed as an introduction to the student of pharmacy. To him it may be useful: it cannot in any sense meet the requirements of the medical student.

NEW APPLIANCES.

AN *improved lamp* for the use of aural surgeons and others has been devised by Mr. Charles Heath, F.R.C.S. Its advantages are that it does not become unduly hot when in use, is stable, is easily cleaned, and can be used for operations as well as for examination work. The accompanying illustration explains its parts and their uses.

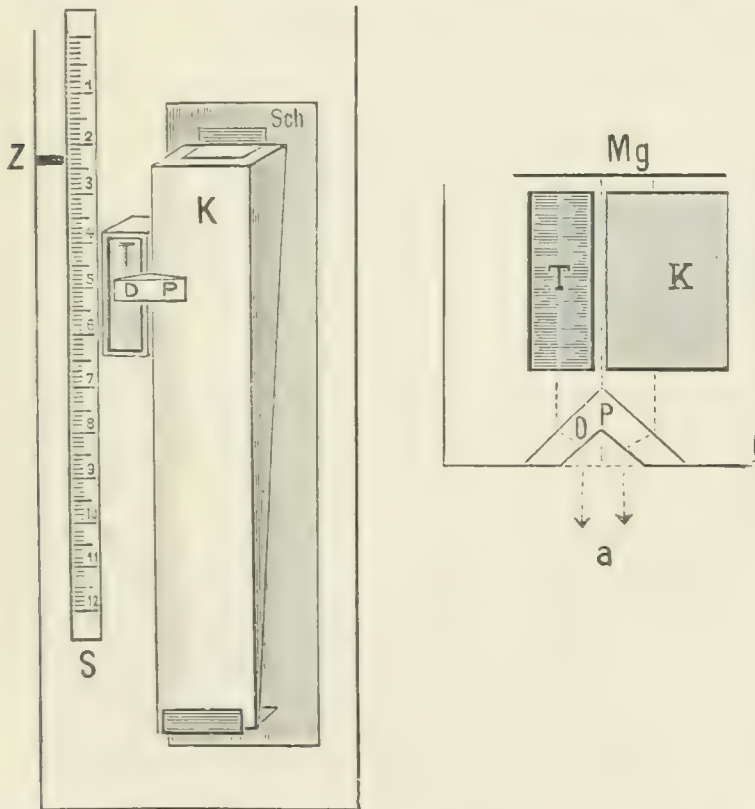


- A. Ratchet, to ensure that the arm (I) shall remain in whatever position it is placed.
- B. Ratchet, to ensure that the lamp when turned in the right direction shall remain there.
- C. Milled Head, for raising or lowering the burner, in order to bring it opposite the lens (the burners vary in size).
- D. Telescopic Tube carrying the lens. This slides easily, and focuses the light.
- E. Tumbler Switch.
- F. Cradle carrying the lantern; on the opposite side this is extended to the top (G) in the form of a cleat, for winding up the flexible wire in a figure of 8 manner, thus preventing kinks.
- G. Top of cleat, just visible.
- H. Movable clamp to be fixed with the thumb-screw at the required height.
- I. Arm carrying the lantern and working on the ratchet at A.

The lamp has been constructed to Mr. Heath's design by Messrs. Mayer & Meltzer.

The *Universal Colorimeter*, manufactured by Messrs. F. Hellige & Co. of Freiburg, is compact and simple in its construction, and compares favourably in price with more complicated instruments.

The standardisation depends upon a hollow glass wedge (K) containing the standard colour, the solution under examination being placed in a trough (T). By means of a screw the wedge can be moved up or down, and that part of it coinciding with the solution under test in the trough brought in juxtaposition with it, and so an exact agreement in colour between the two can be arrived at. The point is registered on the scale (Z) Mg is a milk glass plate which provides the background for the colours, and D P is a double plate which serves to bring each colour into equal fields. There is no separating line between the two colour surfaces, the trough has



parallel walls, the reading is done through a small slit, the wedge remains calibrated once and for all, but a different wedge is necessary for different fluids. It is applicable to the determination of hæmatin and iron in the blood, of iodine in the thyroid gland, of creatin, sugar, and indican in the urine, and a number of other reactions dependent upon the production of colour. It has also a wide application in the arts and industries in which colour is a guide to grade or quality.

The apparatus can be obtained in this country from the usual dealers of scientific apparatuses.

ROYAL COLLEGES.

THE quarterly examinations of the Royal Colleges Board, held in Edinburgh, were concluded on 15th April, with the following results:—

First Examination.—The following candidates passed the First Examination:—J. H. Blackburn, Edinburgh; M. Seeraj, British Guiana; R. Prasad, Dariapur, Gaya; C. F. Pereira, Bombay; W. G. Bowie, Edinburgh; D. C. M. Page, Edinburgh; T. D. Renwick, Crossgates, Fife; Z. A. Green, Hucknall, Torkard; N. R. R. Ubhaya, Mangalore, India; R. V. Clarke, Northwich, Cheshire; W. A. S. George, Bombay; E. C. Brooks, Barachi, India; J. H. Bain, Edinburgh; J. J. Armistead, Kirkcudbright; J. E. Ainsley, Berwick-on-Tweed; T. T. Hoskins, Fingal, Tasmania; and M. A. White, Edinburgh.

Second Examination.—The following candidates passed the Second Examination:—Q. Stewart, Edinburgh; A. Craig, Perth; W. Turner, Belfast; C. L. W. Fleming, Barbados; C. T. Darwent, Trinidad; E. Annequin, Mauritius; A. Rothe, Denmark; J. T. Brady, Belfast; G. L. W. Iredale, Golcar, Huddersfield.

Third Examination.—The following candidates passed the Third Examination:—G. Hardie, Edinburgh; H. E. Rose, Bristol; C. M. G. Elliott, Western Australia; J. M. Hiddleston, Dumfries; M. McCloskey, Co. Derry; A. Sinha, India; W. Chapman, British Guiana; C. Dolan, Ireland; and T. Hardie, Glasgow.

Final Examination.—The following candidates having passed the Final Examination were admitted L.R.C.P.E., L.R.C.S.E., L.R.F.P.&S.G.:—F. A. Scott, Bangalore; C. G. Timms, Melbourne; H. J. Browning, Canada; J. M. Dalzell, Anstruther; L. E. Davies, Southport; W. W. W. Watt, Aberdeen; D. J. Neethling, South Africa; S. D. Large, Co. Antrim, Ireland; J. M. R. Hennessy, Bangalore, India; W. F. Gibb, Dundee; G. A. Macvea, Whithorn; C. L. Bhatia, Amritsar, India; J. Hagarty, Kilrea, Co. Derry; C. H. Hayton, New York City; and W. C. Dunscombe, Portland, Maine, U.S.A.

BOOKS RECEIVED.

- BAILEY, F. R., and A. M. MILLER. Text-Book of Embryology. (Churchill) 21s.
 BRYNE, J. Physiology of the Semi-Circular Canals and their Relation to Sea-Sickness (H. K. Lewis) 12s. 6d.
 BURGESS, MILDRED M. The Care of Infants and Young Children in Health. Second Edition (H. K. Lewis) 1s.
 COLEMAN, F. Anesthetics in Dental Surgery (H. K. Lewis) 7s.
 CROWE, H. W. Consumption: Home Treatment. Third Edition. (Wright & Sons) 1s.
 DENTAL Examination Papers (E. & S. Livingstone, Edinburgh) 1s.
 FELLOWSHIP Examination Papers (E. & S. Livingstone, Edinburgh) 1s.
 GUTTERAS, R. Urology, Vols. I. and II. (D. Appleton & Co.) —
 HEATH, C. J. Nature and Causes of Catarrhal, "Throat," or Hereditary Deafness —
 HONAN, J. H. Handbook to Medical Europe (H. K. Lewis) 6s.
 INDEX Catalogue of Library of Surgeon-General's Office, U.S. Army. 2nd Series, Vol. XVI. —
 INDEX of Differential Diagnosis of Main Symptoms. Edited by Herbert French. (Wright & Sons)
 JANSSEN, M. Achondroplasia. (Brill, Leiden) —
 LEWIS, T. Clinical Diagnosis of the Heart-Beat (Shaw & Sons) —
 MORROW, A. S. Immediate Care of the Injured. Second Edition (Saunders Co.) 12s.
 MOYNIHAN, B. G. A. Duodenal Ulcer. Second Edition (Saunders Co.) 21s.
 MULZER, P. Therapy of Syphilis (Rebman, London) 6s.
 MURRELL, W. What to Do in Cases of Poisoning. Eleventh Edition (H. K. Lewis) 3s.
 NILES, G. M. Pellagra (Saunders Co.) 13s.
 PARSONS, J. H. Diseases of the Ear (Churchill) 12. 6d.
 POLLOCK, C. E., and L. W. HARRISON. Gonococcal Infections (Frowde and Hodder & Stoughton) 5s.
 PROCEEDINGS of the Royal Society of Medicine. (Fannams, Green & Co.) 7s. 6d.
 RIVIERE, C., and E. MORLAND. Tuberculin Treatment (Frowde and Hodder & Stoughton) 5s.
 SAHLI, H. Sahli's Tuberculin Treatment (Bale, Sons & Danielsson) 7s. 6d.
 SECRETAN, W. B. Elements of Anatomy and Physiology. Second Edition (Scientific Press, Ltd.) 2s.
 SURGICAL Clinics of Dr. John B. Murphy. Vol. I. Part I. (Saunders Co.) 35s.
 THE Prescriber's Guide. Edited by Thos. Stephenson (Edinburgh District Chemists' Trade Association) 1s. 6d.
 THE Universal Medical Record. Vol. I. Nos. 1 and 2 (Bale, Sons & Danielsson) 2s. 6d.
 THOMSON, G. Sleep and Digestion (Bale, Sons & Danielsson) 1s.
 TRANSACTIONS of the American Surgical Association. Vol. XXIX. Edited by A. MacLaren (Dorner, Philadelphia) —
 TRANSACTIONS of the Twenty-Third Annual Meeting of the American Laryngological Association (New York, 1911) —
 WALLACE, SIM. The Prevention of Dental Caries. Second Edition (Dental Record) 1s. 6d.
 WRIGHT, A. E. Technique of the Teat and Capillary Glass Tube (Constable) 10s. 6d.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

Dr. Byrom Bramwell. THE banquet given in honour of Dr. Byrom Bramwell in the Hall of the Royal College of Physicians on 17th May was a fitting recognition of his long service as a teacher in the Edinburgh School of Medicine. In proposing the toast of the guest, Sir William Turner, who occupied the Chair, referred to Dr. Bramwell's distinguished career as pathologist, physician, author, and teacher, and characterised him as "one of the most able clinical teachers of his time," and "a man of the highest professional honour." In the course of his remarks Sir William paid a striking tribute to the part played by the extra-mural section in building up and maintaining the reputation of the Edinburgh Medical School, of which Dr. Bramwell has for so long been a distinguished ornament, and he mentioned the interesting fact that one of the circumstances which determined Lord Lister to bequeath his medals, insignia, and diplomas to the University of Edinburgh was that the system of extra-mural teaching which existed under its aegis had enabled him in his early days to become a lecturer in the school with University recognition.

The Provisional Local Medical Committee. CORPORATE action has now been taken by the medical profession in Edinburgh in the election of a Provisional Local Medical Committee. The functions of this committee are two, and the effective discharge of both of these will, in the long-run, make for the good of the public as well as of the profession. In the first place its duty is to collect information for the use of the Insurance Council, and, in the second place, it will hold a "watching brief" over local professional interests. An essential limitation to its activities lies in its being debarred from negotiating with any authority under the Insurance Act. Explicit instruction to this effect was given by the electors, and the restriction of its powers harmonises with the recommendation of the Insurance Council.

The committee as now constituted numbers 37—10 per cent. approximately of those in active practice in the city. General practitioners have 25 representatives, consultants 11, and there is one representative of hospital administration. The question of electing one or more members of the Scottish Advisory Committee elicited differences of opinion, but the meeting, by a decisive vote, was

against their inclusion. On the whole we think that a definite settlement might well have been avoided. We would rather have left the provisional committee, after it had fairly got into harness, to co-opt members of the advisory committee had their help in its deliberations appeared desirable. This would have been the natural course, as ample powers of co-option otherwise were given by the meeting. But although we regret the step taken, we feel that in the circumstances, since only the definite issue—yes or no—was laid before the meeting, the verdict was on the safe side. In necessarily confidential committee work it is apparent that to act on both the provisional and advisory committees might at times place a member in a position of considerable difficulty. This feeling, not distrust of the members of the advisory committee, unquestionably influenced the voting.

In order more speedily to give effect to the instructions of the Insurance Council the provisional committee has appointed a number of subcommittees. Three deal with remuneration, friendly societies, and pledges respectively; these will carry out the first function of the committee, and furnish the Insurance Council with information. Tuberculosis, Institutions, and Consultants subcommittees have also been appointed; their duties are more of a watching and advisory nature. State control of tuberculosis, the duties of hospital staffs towards insured persons, and the teaching of clinical obstetrics are some of the important questions which may come within the purview of these subcommittees. Such problems and others allied to them will demand most careful deliberation if the best interests of the community are to be furthered. And these interests are at least as important in the eyes of the doctor as of the layman. All the health legislation in the Statute-Book is witness that the medical profession has ever placed the ultimate good of the public before immediate personal gain, and it is not likely now to depart from its tradition.

**The Insurance Act and
the Teaching of
Midwifery.**

AMONG the many medical questions raised by the provisions of the National Insurance Act, those enactments which deal with obstetrics are likely to affect medical teaching seriously if carried out in their present form. The propositions referred to are three in number, and run as follows:—

I. Under the National Insurance Act every expectant mother, married or unmarried, who comes within the sphere of the Act receives 30s. as a maternity benefit, the 30s. to cover medical benefits during the confinement.

II. The mother has the right to decide whether she will be attended (1) by a duly qualified medical practitioner, or (2) by a duly certified midwife, and is to have a free choice as to the doctor or midwife who shall attend to her.

III. If she goes to any hospital supported by voluntary subscriptions or charity, this hospital, home, or infirmary *may* have the benefit of the maternity allowance to help to defray the cost of her maintenance therein.

In respect to the *first proposition*, it may be noted that with regard to the women who will receive benefit under this provision the upper limit is clearly marked—£160 a year of income. The lower limit is less clear, and the impression has hitherto been that there would be a large number of women in the very poorest classes of society from whom ample teaching material would still be available for hospitals and dispensaries. In this connection the Scottish Insurance Commissioners, in reply to a letter of inquiry, have indicated that the number thus available will be very small indeed, as, “generally speaking, all persons engaged in manual labour, *whatever their earnings*, will be compulsorily insured.”

With regard to the *second proposition*, it will be noticed that the woman has only two options in her choice of attendance. The certified midwife does not so far exist in Scotland: when she does so exist she may probably be preferred to a qualified medical practitioner, as her fee will be smaller. It will also be clear that dispensary practice in its midwifery department will practically cease to exist, and, further, that a new race of practitioners, *i.e.* certified midwives, will arise in Scotland. According to section 80 (17) of the Act it would seem that “certified midwives” may come to mean any type of midwife whose qualifications the Insurance Commissioners consider sufficient for such a post.

From the *third proposition* it is self evident that *if* the hospital is granted the 30s. for its care of the woman, the latter stands to lose more money than if she remained at home and chose her own attendant (assuming the doctor's fee to be probably £1, and the midwife's less), consequently hospitals will probably only be resorted to in critical or abnormal cases, or where non-payment of contributions has resulted in the loss of maternity benefit. It seems, however, from section 10 (1) that the maternity benefit is not easily forfeited by contributors. The model rules recently issued by the English Insurance Commissioners (*Brit. Med. Journ.*, Supplement, 16th March 1912, p. 316) make the pecuniary disadvantage of the hospital for the maternity beneficiaries plain, as they state in Rule IV. that: “A member of an approved society shall not be entitled to maternity benefit in respect of his wife if she is an inmate of any of the institutions mentioned in the rule relating to hospitals.”

Of course local authorities have the power to order the removal of patients to hospital, but only if the sanitary conditions of their dwellings make it imperatively necessary. Midwives, also, can, under the provisions of the Act, call in a doctor in a difficulty (s. 18 (1)), the fee

being recoverable (subject to the Insurance Commissioners) as part of the maternity benefit.

Without dispensary practice, and with such apparently restricted hospital facilities, it is difficult to see how the effective practical teaching of obstetrics to students, nurses, and midwives can be carried on. When the Commissioners see clearly the above difficulties, which are, we understand, being brought under their notice, they will doubtless be able, from the great powers conferred upon them, and their own sense of reasonableness, to discover some solution of the problem.

The endowment of motherhood is an excellent thing, but the changes wrought thereby in the framework of medical administration must be carefully safeguarded, and in trying to do good to this generation we must see to it that the claim of the next generation to well-instructed medical and nursing attendance is not overlooked.—(*Communicated.*)

The Interim Report of the Departmental Committee on Tuberculosis.

THE Interim Report of the Tuberculosis Committee is a document of great importance to the whole country and to medical men in particular.

The reference to the Committee was purposely made wide—"to report at an early date upon the consideration of general policy in respect of the problem of tuberculosis in the United Kingdom, in its preventive, curative and other aspects, which should guide the Government and local bodies in making or aiding provision for the treatment of tuberculosis in sanatoria or other institutions or otherwise"—in order that the question might be discussed in all its bearings upon the public health. The Report is correspondingly broad in its nature.

The recommendations made are practical and far reaching, and likely to give general satisfaction, in that a real effort is being made to bring into operation a scheme which has the great advantage of having been already thoroughly tested.

The scheme proposed is in effect the Edinburgh anti-tuberculosis scheme, which has been in operation for 25 years, and has been imitated in many parts of the world. The basis of the Committee's scheme (as in Edinburgh) is the tuberculosis dispensary, with which are closely linked the different institutions engaged in anti-tuberculosis work, the sanatorium, farm colony, open-air school, and hospital for advanced cases.

The functions of the tuberculosis dispensary are thus defined—

1. Clearing house and centre of diagnosis.
2. Clearing house and centre for observation.
3. Centre for curative treatment.
4. Centre for the examination of contacts.

5. Centre for "after-care."

6. Information bureau and educational centre.

We think the Committee has done wisely in adopting the principle of co-ordinated effort, as tuberculosis exhibits marked variations in its manifestations at different stages, and consequently calls for equally varied methods of treatment.

In suggesting that the services of existing authorities and voluntary agencies should be enlisted the Committee make a proposal which, if carried out, will do much to ensure the smooth working of their scheme. They thus secure the help of many bodies possessed of considerable experience in working along the lines suggested. This makes for sympathetic co-operation and also helps to avoid friction and overlapping.

In the administrative control of the scheme, in England the unit area proposed is that of the county council, county borough council, or joint councils of several of these bodies, while in Scotland it is that of county councils, district councils, or town councils. It is an undoubted advantage that areas already defined under the authorities mentioned should be adopted, both on account of the presence of existing official machinery and because of the rating powers possessed by these bodies.

The councils are to be responsible for establishing tuberculosis dispensaries and sanatoria in their respective areas (with the aid of the Treasury grant for that purpose) and for their maintenance (assisted by grants from the Insurance Committees). Treatment in such institutions cannot be claimed as a right by insured persons, patients must be recommended by the Insurance Committees of their districts. In this matter it is suggested that the Committees should be advised by the chief medical officers of the dispensaries in their areas. Recommendations are made for the selection of suitable, experienced full-time officers, both for dispensaries and sanatoria, and the Tuberculosis Committee are agreed that the success of the effectiveness and economy of the scheme will depend largely upon the judicious choice of these officers.

On the basis of a tuberculosis dispensary for 150,000 to 200,000 inhabitants, the number of dispensaries required will be from 225 to 300. As regards the provision of sanatorium beds, 9000 is mentioned as sufficient to begin with, being in the proportion of a bed to 5000 population. The same allowance (1:5000) is made for hospital beds which are to be used for urgent cases and for advanced patients whose segregation is necessary on public health grounds. These figures cannot be regarded as extravagant, and medical men will welcome the provision of hospital beds. Children are to be provided for by way of open-air schools, sanatoria, etc., but the estimate of 259 beds for children can only be looked upon as temporary, since tuberculosis is largely a children's disease.

The Committee hold strongly that the co-operation and interest of general practitioners are all-important in the early diagnosis, methodical treatment, and after-care of cases of tuberculosis. Granted their aid, the effectiveness of the scheme will be enormously helped; without it, its usefulness will be seriously curtailed. It is recommended that, when possible, the assistant medical officers of the tuberculosis dispensary shall be medical men practising in the area, also that insured persons being treated at home, under supervision of the dispensary, shall remain under the care of a general practitioner, who shall be paid out of the funds available for sanatorium benefit.

The details of the scheme will necessarily vary in different localities, but, as a rule, the drawing up of a scheme in the first place will rest with the medical officers of health of individual areas. Insurance Committees are authorised to obtain the advice and assistance of any medical officer of health, with the consent of his council, in the exercise of their powers and duties under the Act. Since the councils are to be responsible for the establishment and maintenance of institutions, and the Insurance Committees are to contribute towards their expenses in respect of insured persons, it is proposed that in matters connected with the staffing and internal management of dispensaries a joint-consultative committee of both bodies should be formed. On this committee voluntary bodies interested in tuberculosis should be represented.

As regards cost, when one considers the millions spent annually by public health authorities in segregating and treating other infectious diseases of less prevalence and much lower mortality than tuberculosis, one feels that financially the Committee's proposals offer no serious grounds for criticism. A sum of £1,500,000 was set apart by the Finance Act, 1911, for making grants in aid of sanatoria and other institutions, while the annual probable income of Insurance Committees for providing treatment for insured persons suffering from tuberculosis is estimated at £880,000. The sum of 1d. per annum per insured person is provided by the Exchequer, and may be retained by the Insurance Commissioners for research. This will probably amount to £58,000. The subject of research is to be more fully gone into in the final report.

In short, in its Report, the Committee have described a simple, broad, and far-reaching scheme which is capable of attaining their high aim "that no single case of tuberculosis should remain uncared for in the community."

At the annual meeting of "The Edinburgh Medical Journal," Limited, the directors submitted to the shareholders a satisfactory report for the year ending 31st December 1911. After writing down the value of goodwill and copyright by a substantial sum, a dividend of $10\frac{5}{12}$ per cent. was declared.

ATAXIA: A SYMPTOM.

BEING THE FIRST OF THE MORISON LECTURES, 1912.

By J. J. GRAHAM BROWN, M.D., F.R.C.P.,
Physician to the Royal Infirmary : Lecturer on Neurology, University
of Edinburgh.

I.

MR. PRESIDENT, Fellows of the Royal College of Physicians,—My first duty—and it is a pleasant one—is to express my sense of the honour done me in inviting me to deliver this course of lectures. If I feel that honour deeply, so do I also feel, quite as deeply, the responsibility which has thus been laid upon me, for it is no light thing to address an audience such as this.

Nor was it easy to select a subject which should be fitting and appropriate for the purpose—one with which I was myself in some closeness of touch, and one with which I might venture to hope that this audience would be in full sympathy.

After careful consideration I resolved to take as the topic for discussion some special symptom, or rather some particular function of the body and the derangements to which that function is liable. It may be asked whether it would not have been simpler to have devoted our study to a particular nervous disease in which that function is characteristically disturbed. That would doubtless have been an easier course to take, but it would hardly have led us far enough, nor would it have served the purpose for which these lectures are designed.

In viewing a single function as a whole, we stand, as it were, further off. We can thus appreciate its bolder and broader outlines; we can see its true bearings and relationships. Moreover, when we examine the many different ways in which its disturbance is brought about, we are able to draw more accurate conclusions as regards the true origin and nature of such disturbances.

A simple example will show what is here meant. How much should we know of the true nature of the act of coughing were we to consider it only as a symptom of pneumonia? What should we know of ataxia if we thought of it merely as a symptom characteristic of tabes?

Moreover, when one comes to look at the matter closely, it

seems as if it were natural to study some one function of the body on an occasion such as this, for the diagnosis of nervous disease must always start from the evidence of derangement of function, and must therefore ever rest on the firm basis of known physiological fact. Only after that basis has been reached can our reasoning be transferred to an anatomical and pathological basis and a localising diagnosis be made, *i.e.* a judgment be formed as regards the actual lesion which is present and the exact tissue which is involved in the process.

If one takes the trouble to analyse the steps by which, consciously or unconsciously, the diagnosis in any particular case is arrived at, it will be found that the questions which one puts to one's self are in essence the following:—

A. Diagnosis by physiology—

1. What function is deranged?
2. What neurones subserve that function?

B. Diagnosis by anatomy—

3. Where do these neurones lie, *i.e.* what are their anatomical relationships?

C. Diagnosis by pathology—

4. What morbid processes are capable of affecting these particular neurones injuriously?

Thus we may speak of:—

Clinical physiology.

Clinical anatomy.

Clinical pathology.

Of these, the last two are well-defined terms. The subjects with which they deal are constantly being referred to, constantly being taught in our schools. But how shall we define the first term—clinical physiology?

We shall see its meaning and scope best if we think of some particular function of the nervous system and ask ourselves the questions:—What are its normal clinical characteristics? What is the form and method in and by which that function expresses itself in the healthy human being? We may be sure that that will ever be something making for good—(*a*) in the building up or maintenance of the vitality of the individual, or (*b*) in guarding him against injury, or (*c*) in the perpetuation of the race to which he belongs.

To use clinical physiology for diagnosis, we must know:—

1. What *tests* we ought to apply in order to ascertain whether the function we may be investigating is or is not normal.

2. What *deviations* from the absolute normal standard are compatible with health.

Regarding the matter from this point of view, it seemed to me that these lectures might usefully be devoted to the study of some particular function of the body and the derangements of that function. The one chosen is *co-ordination* and loss of co-ordination, *i.e. ataxia*.

When the smooth, easy, exact, and delicate movement of perfect co-ordination gives place to one which is jerky, strained, inexact, coarse, and irregular, we speak of ataxia. By that term we mean a disturbance of innervation, other than paralysis, which prevents the proper carrying out of a movement. Ataxia in this sense is therefore equivalent to inco-ordination, and we can best reach a proper definition of that term by defining its opposite, namely, co-ordination.

By co-ordination we mean a harmonious muscular movement which is performed in the simplest and easiest way compatible with accuracy, so that its purpose is exactly fulfilled with the least possible expenditure of neuro-muscular energy.

To attain this symphony of movement the muscles engaged must act harmoniously, certain contracting, certain relaxing, and contracting or relaxing, in *certain groups*, in a *certain order or sequence*, in a *certain rhythm*, and with a *certain strength*. Moreover, this strength is not uniform, but is smoothly graded, increasing or diminishing as the action proceeds.

We shall appreciate more fully the enormous complexity of the subject if we remember that in some actions hardly a muscle throughout the body is not engaged. A swordsman, in the quick play of the rapier, must use not merely his hand, arm, and shoulder as the steel flashes out, but he must balance his body with a delicate precision. He must throw his whole weight into the thrust and yet not overbalance. He must hold himself in instant readiness to parry. Eye, hand, foot, trunk must all engage, must each play its part, so that his aim may be sure and his attack effective. The complex multiplicity of even everyday actions is so great, the varieties of muscular combination so infinite, that it has been said, probably with close approach to

truth, that never in one's whole life does one perform the same action in every detail twice.

To direct such complicated movements there must obviously be controlling and guiding centres, and these centres are mainly (1) in the anterior horns of the cord and the homologous cranial nuclei; (2) in the cerebellum and basal nuclei; (3) in the cerebral cortex.

These centres must possess accurate knowledge as regards the position of the limb, the degree of flexion or extension, of pronation or supination, and, generally, the condition of the muscles, whether they are contracted or whether they are relaxed. And this knowledge must cover the condition of these structures, not merely before a movement has commenced, but also from instant to instant throughout the whole performance of that movement.

Obviously, therefore, afferent, informing impressions are necessary, not merely one or two but a multitude of them. These impressions are for the most part subconscious. They are proprioceptive in Sherrington's nomenclature—that is, they are such as are excited by changes going on in the organism itself, chiefly mechanical strains and stresses, movements of muscles, pressure. These impressions we group together under the term “muscular sense,” using indeed the very words which Charles Bell employed when he first described what he quite logically called the sixth sense.

We shall presently define that term by endeavouring to show what varieties of stimuli it includes, from what receptors these arise, what is the adequate stimulus in each case, by what paths these stimuli proceed, to what centres they make their way, by what efferent tracts these centres act, and by means of what terminal apparatus their stimuli become effective and are translated into action.

In the meantime, however, we shall simplify and, I hope, clarify the problem before us if we turn aside for a moment to consider certain simple actions and their mechanism. We cannot, it is true, attain complete simplicity, however much we may strive to do so, for, so far as I know, there is no instance in which one voluntary muscle acts normally by itself alone—no action in which one muscle, only, takes part.

To Sherrington, in one of the earliest of that brilliant series of researches on the neuro-muscular apparatus with which he has enriched science, we owe our knowledge that if a muscle is made to contract, its antagonist relaxes. If, for example, in a decere-



FIG. 1.—THE NORMAL GRASP.



FIG. 2.—GRASP IN A CASE OF TABES.

brate preparation—that is an animal in which trans-section has been performed just above the pons—the purely muscular nerve from one of the flexors of the knee be cut and its central end stimulated, an instantaneous change takes place in the extensors of the knee. These, which had previously been in a state of tonic spasm, now suddenly relax. This most interesting phenomenon, this reciprocal innervation as Sherrington calls it, is an important, even an essential, element in the scheme of co-ordination. It is quite independent of consciousness, and without any sort of doubt is regulated from spinal cord centres.

On careful investigation it has been found that this relaxation of the antagonist is simultaneous with, possibly even precedes, the contraction of the agonist. It cannot therefore be reflex in origin, and indeed the mechanism of its production is not definitely known. Apart from the possibility of the presence of inhibitory fibres, we may consider the possibility of a stimulus passing from the dendrites of one motor cell to those of another in its near vicinity, either directly or by means of an intercalary neurone. But whatever be its exact mechanism, it is easy to convince oneself clinically of this antagonistic relaxation. If the foot be strongly dorsiflexed and the sole pressed at the same time against a firm resistance, then when an attempt is made to extend the foot, the muscles of the calf will be felt to contract, while their antagonists on the front of the leg relax. So far as my observations go, this reciprocal innervation is not disturbed in cases of tabes.

But while this beautiful mechanism will be found to prevail generally throughout the body, there are certain apparent exceptions which require passing notice. The grasp of the hand is one of these. Duchenne first pointed out many years ago that in this action not only do the flexors contract, but also the extensors; that is, the antagonistic muscles instead of relaxing, as is the general rule, contract (see Fig. 1). Opinions differ as regards the exact meaning of this synergic contraction, but all agree that the contraction of the extensors is designed to assist the action of the flexors in the grasp. The rule seems to be that when, in the case of any particular movement, relaxation of the antagonists will help, they relax. When, on the contrary, a synergic contraction is needed to steady a joint or to increase the energy of the contraction, then that synergic contraction will take place.

The reflex centre for the flexor part of the grasp of the hand

lies probably in the spinal cord. It certainly cannot lie above the pons, for grasping movements have been observed to take place in anencephalous monsters. The synergic portion of the grasp is probably cortical in origin. It is absent in infants until about the third or fourth month.

These synergic movements, and there are many of them, are apt to be disturbed by diseased processes. To a want of synergy, to a failure in the exactitude of the contraction relations of agonist and antagonist, has been ascribed the volitional or intention tremor of disseminated sclerosis. These characteristic movements are, without doubt, movements of inco-ordination, and it seems highly probable that the method of their production is that just mentioned. We shall see, later, that cerebellar control has some special relation to synergic movements, and it is well

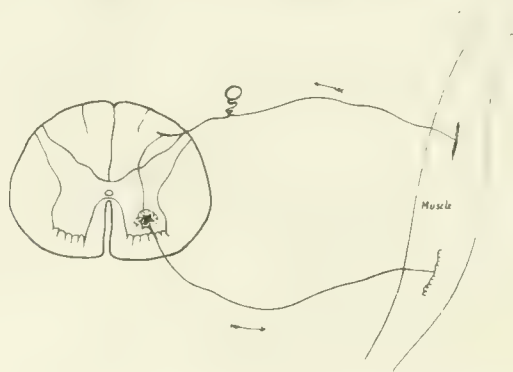


FIG. 3.—DIAGRAM OF REFLEX ARC.

known that the cerebellum is frequently and deeply involved in multiple sclerosis.

In some cases of tabes the synergy in the action of grasping just described is lost, and I show you a photograph of the hands in a case of this kind which has quite recently come under my observation (see Fig. 2).

Let us now turn to the consideration of the reflex arc. From it, from its behaviour, its properties, its characteristics, its performances, we shall obtain some light on the problems of co-ordination and on those pathological changes which give rise to ataxia.

In so far as muscular sense is concerned, the component parts of the reflex arc are as follows:—There is, in the first place, the afferent neurone leading from the muscle. The centre of nutrition of this neurone is the cell in the corresponding spinal ganglion. Of these cells there are, as we all know, many varieties. Dogiel recognises at least eleven different kinds, and their differences are

not merely morphological, but in all likelihood express differences in function as well. Of this neurone we must regard the fibre leading from the muscle as the dendrite, and the posterior root fibre we must look upon as the axone of the cell. It is perhaps worth noting that the fibres of this neurone differ morphologically from those proceeding from the receptors of the skin, their fibres being larger and coarser than the latter. Entering the spinal cord the posterior root fibres divide into ascending and descending branches, both of which give off many collaterals. The one with which we have to deal at present is the reflex-collateral, which curves through the posterior column of the cord to reach the grey matter, through which it passes to the anterior horn (see Fig. 4).

The efferent or motor neurone, which forms the other side of the reflex arc, consists, as we all know, of the motor cell in the anterior horn of the cord with its dendrites and its axone, the latter forming the motor fibre by means of which the muscle is set in action. This motor neurone forms the "*final common path*," as Sherrington, with happy terminology, has styled it. By it, and by it alone, can stimuli reach the muscle. Whether such stimuli originate in the cerebral cortex, in the basal ganglia, in the cerebellum, or in the cord, they must each and all pass through that one terminal tract leading to the muscle—the final common path.

The transmission in the reflex arc is therefore from the muscle through the fibrils of the afferent neurone, thence through the synapse in the grey matter of the anterior horn to the fibrils of the efferent neurone, and so back to the muscle again. The rate of transmission through such a reflex arc as this is notably slower than that through nerve-fibre alone, and there is ample evidence to show that the retardation takes place at the synapse. It is also just at this synapse that certain poisons such as strychnine and tetanus act, disturbing the co-ordinating mechanism. As is well known, these neurones—afferent and efferent—though so closely related in function, have no structural connection, the fibrils of the one ending in minute bulbous swellings which lie very close to those of the other.

In so far as concerns co-ordination and its reverse, ataxia, the afferent neurone is the one chiefly, if not entirely, concerned, for by it the impressions, which we group together as those of muscular sense, are conveyed towards the centres. Its degeneration and consequent loss of function is the essential lesion of tabes.

How, then, does it reveal its function? It does so clinically,

by reason of the effects it produces on the efferent or motor neurone; and these again we can gauge by observing the results on the muscle. Of those effects which are clinically observable the most important is *tonus*.

By *tonus* is meant a slight, steady, nearly continuous muscular contraction, which is due to a stimulus from the afferent neurone of the arc playing upon the efferent or motor neurone. (Later we shall see the important influences which stimuli from the semicircular canals exert on this condition.) On the presence of muscular tonicity depend the phenomena of the knee-jerk and of the other so-called deep reflexes. Section of the afferents from the skin receptors of the same segment does not affect it, but it at once disappears if the afferent from the muscle is cut. It is for this reason that the knee-jerk is lost in cases of *tabes*, the afferent neurone having degenerated and being therefore incapable of fulfilling its function.

Obviously there are many points connected with the reflex arc which have an intimate bearing on the present subject. The grading of the agonist, as contrasted with the antagonist, is an important function of the reflex centre, for the relaxation and contraction of these respectively ought to be suitably balanced. If the relaxation were not sufficient the contraction would be impeded, whereas if it were too great there might be a corresponding degree of looseness or shakiness about the subsequent movement.

It must be clearly understood that the afferent neurone from the muscle to the cord is special in function, bringing stimuli from the muscle to the centre. These stimuli have been selected by special receptors, which are tuned, as it were, to receive these specific stimuli alone and to reject all other stimuli which are not in harmony—much as wireless instruments are tuned to answer to special wave-lengths. These stimuli, carried to the spinal cord through these special afferents, reach the reflex centre, which is itself specially arranged for co-ordination. The movement, thus co-ordinated, is effected through the lower motor neurone—the final common path.

The afferent innervation from the muscle is therefore designed for the purposefulness of movement, that is, for perfect co-ordination. If these fibres degenerate, then that co-ordination is no longer possible and *ataxia* results. *Ataxia* so brought about is typically seen in cases of *tabes* and in certain forms of peripheral neuritis, particularly that produced by alcohol.



FIG. 4. -REFLEX COLLATERALS OF POSTERIOR ROOT (LENHOSSEN).

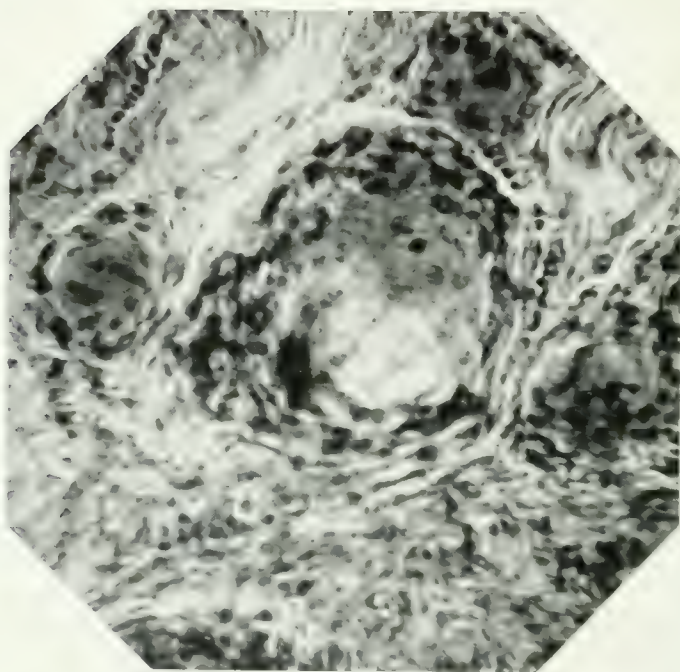


FIG. 5.—MICRO-PHOTODUPE OF SPINAL GANGLION CELL
IN TADIS. $\frac{1}{4}$ OIL IM.

It will be necessary to refer so frequently to tabes that a brief statement regarding its pathology may now be made, in so far as the ataxic symptoms of that disease are concerned. The more recent work, especially that of Spielmeyer on experimental tabes, leaves us in no doubt as to the essential nature of the process. Without any question we have to deal here with a primary elective toxic degeneration of afferent fibres. This degeneration no doubt affects the whole neurone more or less, but the place of least resistance is to be found in the collateral of the posterior root, and therefore it is there that the signs of degeneration first show themselves as a patch in the column of Burdach. The old view that this was the result of a meningitis, and directly due to pressure on the fibres of the posterior root as they traverse the pia, is quite untenable.

As in all such toxic processes, the function of the neurone is affected before morphological changes have had time to show themselves. Just as in amyotrophic lateral sclerosis the morphological changes in the pyramidal tract can first be detected in the distal part of that long neurone where its vitality is lowest and the axone least resistant, so here the degenerative change appears first in that portion of the axone which is furthest removed from the cell.

Presently, as the disease progresses, the cells of the spinal ganglia begin to exhibit signs of morbid change (see Fig. 5). Fatty degeneration of the protoplasm commences, the satellites of Cajal accumulate, the cells vacuolate, break down, and ultimately the remains, surrounded by a ring of satellites, form the *nodules résiduels* of Nagotte.

These satellite cells are extremely interesting. In health they show themselves as flat, usually triangular, plate-like bodies, with long branching pseudopodia. They are probably the homologues of the cells of Schwann in connection with the nerves. Present normally in small numbers, when degeneration commences they draw in their pseudopodia and crowd to the injured point. Their action is believed to be rather histolytic than phagocytic.

To return to the spinal cord as a centre of co-ordination, it has to be observed further that section of all the afferent nerves of a limb does not render the limb incapable of voluntary movement in the rough. The results of electrical stimulation of the cortex, for example, are not materially affected thereby. But, as Sherrington and Mott have shown, when the posterior roots have been cut in a monkey, the animal will not voluntarily

use the apæsthetic limb. I am aware that H. Munk has controverted this statement, but unquestionably it is correct. Indeed the observation in its essence is an old one for Charles Bell showed long ago that if the supramaxillary division of both fifth nerves were cut in the ass, the use of the upper lip for prehensile movement was lost. The reason why the deafferented limb is not used is probably that the tonus of the muscles is completely lost and that therefore the motor neurone no longer receives the stimulus of afferent muscular impressions.

Why, then, one may ask, is voluntary movement not usually lost in tabes? The explanation obviously is that all the afferents have not degenerated.

In so far as the motor side of the reflex arc is concerned, the results of diseased processes are well known. A lesion of this kind gives rise to a paralysis of the lower motor neurone type with all its characteristics. These, however, do not specially concern us now.

But before leaving the consideration of the reflex arc there is, in the normal state, a special function connected with the reaction of that arc which is peculiarly interesting in view of co-ordination, *i.e.* the reversal or *Umkehr*. This remarkable phenomenon was first observed by v. Uexküll in the starfish. He found that when an afferent stimulus played upon a group of motor nerve-centres certain of these centres responded, while others did not do so. He was able to show that the determining factor is the momentary condition of the muscles innervated by those centres, and that the centres which answer to the stimulus are those corresponding to muscles which are most on the stretch at the time. The same law holds good in the vertebrates, and the most complete demonstration of its truth is that which has recently been given by Magnus.

In a spinal dog, one in which trans-section of the cord has been made between the eighth and twelfth dorsal segment, if a patellar tendon—say, the left—is tapped, the stimulus produces a jerk in both legs. Magnus shows that the result in the case of the right leg depends upon the passive position in which that limb happens to be at the moment when the tap is given. If that position is one of extension then the movement is flexion, whereas if the limb is flexed then extension follows the stimulus; that is, one and the same stimulus will produce opposite effects according to the passive position of the limb at the time. This singular phenomenon is what

is known as the reversal effect, and there is conclusive proof that this effect depends upon the afferent neurone from the muscles concerned. The play of the afferent neurones of a *stretched* muscle appears to tune up the motor neurone and to render

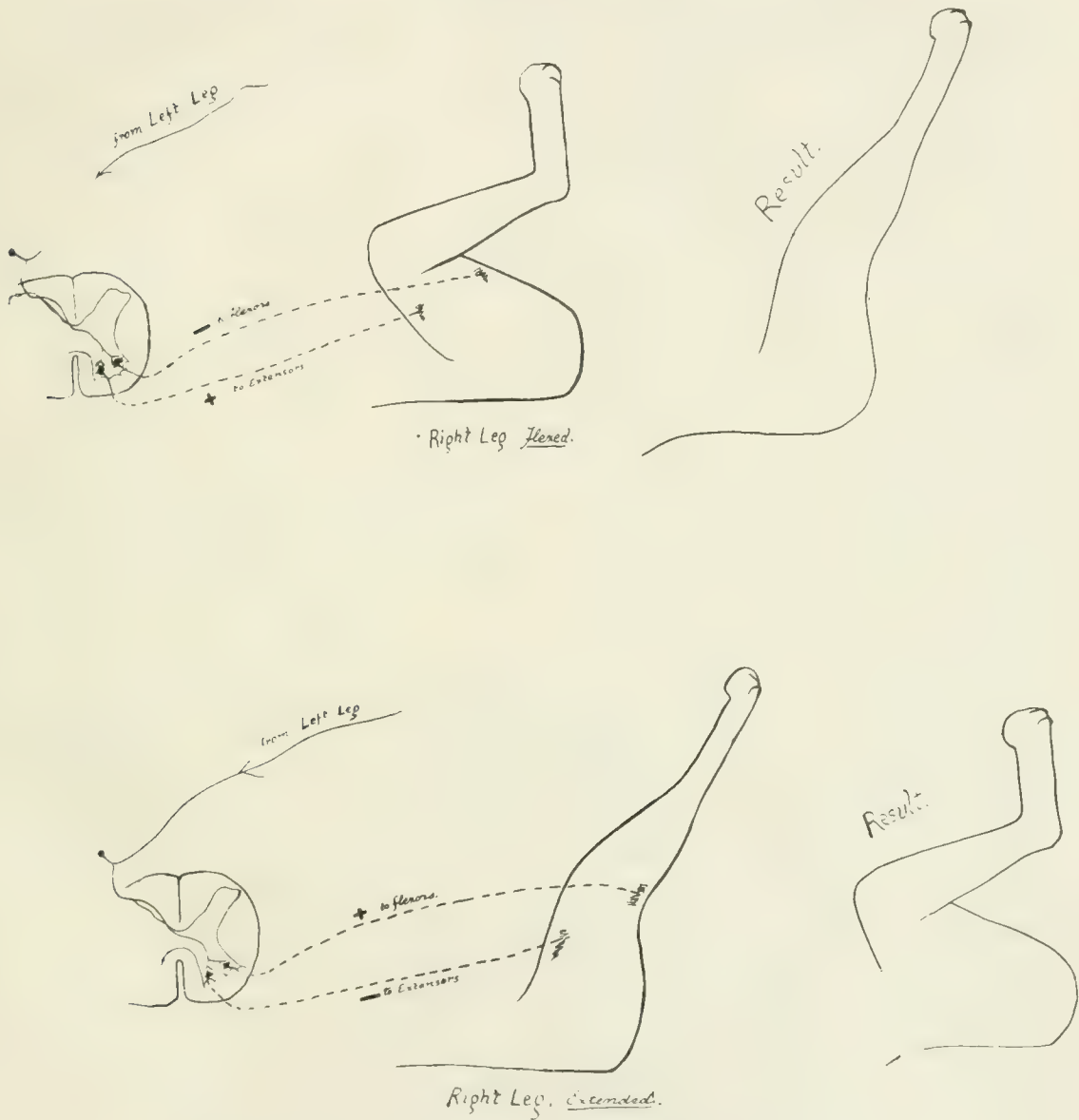


FIG. 6A.—DIAGRAM OF THE REVERSAL (AFTER MAGNUS).

it more susceptible to respond to the stimulus than is that of the relaxed muscle.*

No doubt this takes place clinically and under our very eyes, but it is then so veiled by other motor phenomena that it is not readily perceived. We may see, however, an indication of its

* What is true as regards the passive position of the limb has been recently shown by T. Graham Brown to be true also of the active.

presence in connection with the conditions which determine the crossed adductor jerk.

From every point of view, therefore, it is evident that the important thing for us to consider in connection with the present subject is the stimulus which the afferent neurone brings from the muscle to the spinal cord; and we now turn to ask ourselves the question, Whence does this stimulus arise, and what receptors has Nature attuned to receive it? In connection with the muscles and tendons of the mammal there exist two such specialised receptors—(1) the muscle-spindle; (2) the Golgi tendon-organ.

The muscle-spindle was first observed in the year 1862 by Kölliker, who took it to be identical with Weismann's embryonic fibre. In the following year Kühne discovered spindles in the mammalian muscle, and from this date onwards these most interesting structures have been studied by Golgi, by Kölliker, by Krause, and by many others. As regards their function very different views prevailed. They were thought by some to be centres of new growth in the muscles, by others they were looked upon as lymphatic structures, by yet others they were regarded as pathological, as foci of inflammation. It was not till the year 1888 that Kirschner, in the course of an article on the subject, hazarded the suggestion that muscle-spindles might possess a sensory function. Six years later, in 1894, Sherrington, by conclusive experiment, proved that they were afferent receptors.

The muscle-spindle is fusiform in shape (see Fig. 6 and Fig. 8), its long axis lying more or less parallel with the muscular fibres in which it is embedded. It consists of a many-layered fibrous capsule enclosing a lymph space which is crossed by fine membranous septa and filaments. Then comes a delicate axial sheath enclosing the intrafusal muscular fibres, which are markedly embryonic in character with abundant protoplasm. These intrafusal fibres, usually tendinous at one or other extremity, split up into numerous daughter fibres, and towards the equatorial region of the spindles they lose their striation. At this point they are surrounded by many nuclei, spherical or oval in shape, and clear in appearance.

Round the fusul fibres there wind, in spiral form, large myelinated posterior root fibres, of which several subserve each spindle. As they enter the spindle their sheath of Henle becomes continuous with the capsule. They then divide dichotomously and, in the case of each fibre, after losing its



FIG. 6.—MUSCLE-SPINDLE, DIAGRAMMATIC (AFTER REGAUD).



FIG. 7. TENDON-ORGAN, DIAGRAMMATIC (AFTER REGAUD).



FIG. 8.—MUSCLE-SPINDLE (DOGIEL).

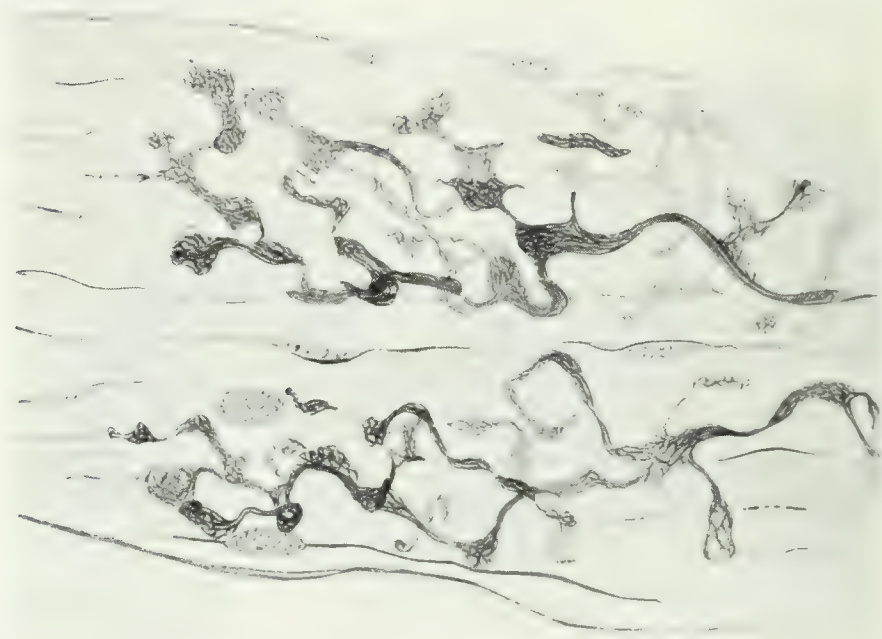


FIG. 9.—TENDON-ORGAN (DOGIEL).

myelin, the axone constricts, flattens out into a ribbon, and applies itself in an intricate spiral interlacement round and between the fusul fibres. Such, then, is the commencement of the afferent muscular neurone.

Motor fibres branching from the ordinary motor muscular nerve also reach the muscle-spindle. They pierce the capsule and end in motor platelets at one or other extremity of the fusul fibre.

Connected with these singular receptors there are many interesting points, one or two of which may be mentioned here. They develop during the fourth intra-uterine month, that is at a period considerably earlier than that of ordinary muscular fibre. Moreover, singularly enough, the muscle-spindles do not degenerate after section of both anterior and posterior nerve-roots, neither do they hypertrophy after exercise, as ordinary muscular fibres do, and lesions which are fitted to cause degeneration of muscle do not affect the spindles; these remain intact.

The tendon-organ of Golgi is formed much on the same plan (see Fig. 7). There, also, we find a capsule enclosing a lymph space in which, however, lie, not muscular fibre, but delicate embryonic tendon fibres, which are attached at one end to the tendon, at the other to the ordinary fibres of the muscle in question. The afferent fibre of this receptor is much like that of the muscle-spindle. It forms irregular ribbons, which are rolled in spirals round and between the tendon fibres. These spiral terminations are found, when carefully stained, to consist of ramifications of fine neuro-fibrils (see Fig. 9).

It remains for us to consider how these receptors are stimulated. As regards the tendon-organ, it seems clear that it is placed there for the purpose of measuring traction, *i.e.* that the adequate stimulus is the pull on the tendon. But with regard to the muscle-spindle there are many theories, all of which, however, agree in this, that that receptor is designed to measure muscular contraction. In what way, however, it does this is a matter of considerable dubiety. It has been assumed that the stimulus which excites this form of receptor is due to external pressure exerted on the capsule by the contraction of the muscle in which it lies. Others believe that the pressure within the capsule is raised by the contraction of its fusul fibres; others, again, conceive that the stimulus arises by reason of the pressure of the contracting fusul fibres upon the spiral nerve fibres which

surround them, or that these are stimulated by the action-current in these fusar fibres as they contract. It seems to me probable that one or other of the two last theories is likely to be correct.

There is one other point in connection with this subject to which passing allusion may be made. In the last few years there has been much discussion and much theorising with regard to that singular structure in the wall of the heart, the atrio-ventricular bundle, which is generally regarded as a mechanism by means of which the rhythm of the heart is controlled and regulated. Anyone who examines with care this remarkable bundle of His must be struck with certain peculiarities which it possesses. The muscular fibres of which it is composed are notably embryonic in character and structure. They, like the intra-fusar fibres of a muscle-spindle, are surrounded by a fibrous capsule. Penetrating this capsule and spirally surrounding these fibres numerous nerve-fibres can be traced. The resemblance is therefore singularly close, and I think we may well consider the possibility, nay, even the probability, that the atrio-ventricular bundle is in reality a mass of highly differentiated receptors tuned to perceive the commencement of contraction in the wall of each cavity of the heart, which stimulus, transmitted to local centres, would serve to regulate rhythmically the contraction of each chamber.

ACUTE MYELOCYTHÆMIA ASSOCIATED WITH OSTEO-SCLEROSIS AND OTHER UNUSUAL FEATURES OCCURRING IN AN INFANT.*

By ALEXANDER GOODALL, M.D., F.R.C.P.

A FEMALE child aged 10 weeks was admitted to the Royal Hospital for Sick Children, under the care of Dr. J. S. Fowler, on the 12th of March 1912. She was suffering from bleeding at the nose and diarrhoea.

History.—The patient had spent the greater part of her life in a kitchen bed-closet, but the hygienic surroundings were otherwise fairly good. Her father, aged 43, and mother, aged 38, were both strong and healthy. Patient was the seventh child. The second child died at the age of 10. He had been blind, and was said to have been born "with a clot on the brain." The third child died

* A paper read before the Edinburgh Medico-Chirurgical Society, 1st May 1912.

at the age of 5 months, cause unknown. The other members of the family were alive and healthy.

Present Illness.—The child has been fed on the breast since birth, and was in good health till three weeks before admission. At that time the mother noticed that the child was a bad colour, and then it began to bleed from the nose. The child was brought to the out-patient department of the hospital, where it was seen by Dr. McNeil, who found that there was jaundice and pallor. There was no enlargement of the liver or spleen. The epistaxis at first was slight and infrequent, but latterly became almost constant. Two days before admission bleeding began from some small excoriations in the gluteal region. There was fairly profuse diarrhoea, but no hæmorrhage from the bowel. Hæmatemesis also began two days before admission.

State on Admission.—The temperature was 96° , pulse 116. The child was small, and looked more like a child of 4 than a child of 10 weeks. The fontanelles were widely open, the hair scanty. There was great pallor, and the child was emaciated. There were no signs of rickets or syphilis. Thin watery-looking blood was oozing from the nostrils and also from some excoriations on the buttocks. There were fairly numerous petechial spots scattered over the trunk and limbs.

Alimentary System.—On the tongue there were a few small ulcers. The abdomen on inspection showed nothing abnormal. The liver was enlarged, and reached a point $1\frac{1}{2}$ ins. below the costal margin.

Hæmopoietic System.—No enlarged lymphatic glands could be felt. The spleen was enlarged and easily palpable, reaching about an inch and three-quarters below the costal margin.

The Blood.—Blood flowed readily from a small puncture in the lobule of the ear, and bleeding continued for ten minutes afterwards in spite of the application of cotton wool and adrenalin. Red corpuscles numbered 1,100,000; leucocytes, 75,000 per c.mm.; hæmoglobin was 22 per cent. (Oliver); colour index, 1. The blood looked very pale and watery. Rouleaux formation was deficient. There was considerable diversity in the size of the red cells, the average being increased. There was marked poikilocytosis. Polychromasia was fairly pronounced, and many of the red cells showed basophilic stippling. Nucleated red cells were numerous. Megaloblasts numbered 54,000, and normoblasts 48,000 per c.mm.

A differential count of the white cells was as follows:—Polymorphonuclear neutrophils, 26; large lymphocytes, 14.5:

small lymphocytes, 9.75; eosinophils, 1.5; neutrophil myelocytes, 46; eosinophil myelocytes, 2; basophils, 0.25.

A notable feature in connection with the white cells was the difficulty in demonstrating the neutrophil granules. In films treated with Jenner's and by Wright's stain in the ordinary way the myelocyte granules did not stain at all, and the neutrophil granules in the polymorphs were of a much more blue tint than usual. As a result one's first impression was that there was something like seventy per cent. of lymphocytes, half of which were large and half small. In films stained with Ehrlich's triple stain and by Jenner's stain in full strength for two minutes and then in a dilute form for a further five minutes it was seen that the majority of the leucocytes present were myelocytes. Some of them were of small size. Many of the cells classed as large lymphocytes had deep basophil protoplasm and a vesicular nucleus, doubtless myeloblasts or pro-myelocytes. The difficulty of classifying them separately is the presence of intermediate forms. The other systems showed nothing noteworthy. The pulse was not easily felt at the wrist, but could be counted at the fontanelles. The heart sounds were closed. There was good expansion of the lungs. The knee-jerks were present, the plantar reflexes were extensor in type, and the child seemed to take some notice of its surroundings. The urine was not obtained.

Progress.—Pledgets of wool soaked in adrenalin 1-10,000 were applied to the nostrils and to the excoriations on the buttocks. The food ordered was albumen water, and 10 drops of whisky were given every four hours. Sickness occurred, and with the vomited albumen water there was a little dark blood. A motion green in colour was passed. It did not contain blood. The child became cold and collapsed, and a hypodermic injection of strychnine, subcutaneous injection of saline, and a mustard pack were tried in succession. Death occurred at 8 P.M. on the day of admission.

A post-mortem examination was made 16 hours after death by Dr. Carnegie Dickson. The subcutaneous and muscular tissues were pale. The serous membranes showed nothing of note. The heart muscle was pale, but there was no other obvious abnormality. The lungs showed numerous large irregular dark patches of collapse with a few hæmorrhages.

The *liver* was enlarged and smooth. On its upper surface there were some half a dozen rounded white thickenings in the capsule. These measured from 1 to 3 mm. in diameter, and were

quite superficial. The surface otherwise was a dark green, and showed a mottled appearance due to the presence of innumerable little opaque greenish-grey points in the substance of the liver showing through the capsule. On section the appearance was irregular, dark greenish-brown areas alternating with dark red and less homogeneous looking areas.

The *spleen* was enlarged. It was firm in consistence. There was slight fibrous thickening towards the surface in a few small areas. On section the colour was uniformly dark. No Malpighian bodies could be differentiated with the naked eye.

The *stomach* contained viscid mucus and some dark altered blood. The wall was pale but not markedly altered. The *intestines* were thin, pale, and atrophied, and covered with thick mucus. Here and there were deposits of dark altered blood. There was no ulceration and no enlargement of lymphoid tissue. *Lymphatic glands, thymus, thyroid, and suprarenals* showed no morbid appearance to the naked eye.

The *bones* showed a remarkable thickening. In the sternum and ribs the marrow was dark red, but was in very small amount. The cancellous tissue was very dense, and it was impossible to squeeze out any of the marrow. In the shaft of the right femur the medullary cavity was very narrow, and seemed to be crossed in all directions by thick trabeculæ of bone. The marrow here was also dark red, but again it was impossible either to express or excise a portion of marrow even moderately free from bone. In the shaft and upper diaphysis of the right humerus the same condition was found. The marrow was more abundant, but appeared to be all enclosed in small thick-walled bony spaces. It was just possible to express enough to make film preparations.

Microscopic Changes.—Portions of the organs were fixed in 10 per cent. formaline to which a few crystals of corrosive sublimate had been added. A portion of the humerus was afterwards partially decalcified in dilute nitric acid. The specimens were embedded in paraffin, and sections were stained with eosine and methylene blue and hæmatein and eosine. Sections of liver and spleen were also stained by the ferrocyanide method for iron, with carm-alum as a counter-stain.

Liver.—The liver showed slight fatty change, and there were areas of cloudy degeneration with poorly stained nuclei. The liver cells, especially towards the periphery of the lobules, showed enormous quantities of golden-brown pigment which gave the free iron reaction to such an extent as to give specimens a uniform blue

colour to the naked eye. Many of the bile capillaries and some of the smaller bile ducts contained masses of bile of a bright green colour. The amount of leukæmic infiltration was not great, but all the portal tracts were invaded, and there were scattered areas of cellular invasion between the liver cells. In these areas the invading cells were myelocytes, lymphocytes, eosinophils, and a fair number of nucleated red cells were present. Here and there in the sinusoids were large round cells, probably endothelial, a few of them containing pigment. One or two giant cells of bone-marrow type were also noticed.

Spleen.—The Malpighian bodies were small and inactive. In the pulp were the usual cells with islands of myelocytes and a few eosinophils. Nucleated red cells were no more numerous than in the peripheral blood. There was great abundance of iron-containing pigment, practically all intracellular. In ferrocyanide specimens the reticulum in many parts was mapped out in blue owing to the presence of iron in the endothelial cells. Many large free cells in the sinuses were so packed with iron pigment that they showed a diffuse blue against which the nucleus stood out in striking contrast.

Kidneys.—The kidneys showed little change. There were a few small areas of leukæmic infiltration separating the tubules in the cortex.

Lymph Glands.—There were no germ centres in the specimens examined. Many of the lymph paths were packed with myelocytes, lymphocytes, and eosinophils. A few large cells acting as phagocytes to red corpuscles were noticed.

Bone and Marrow.—Transverse sections of the softened humerus showed no definite medullary cavity (Fig. 1). There were a large number of spaces surrounded by thick bony trabeculæ. In many of these the remains of the primitive cartilage could be distinguished, but except for their thickness no abnormality could be detected. The marrow showed a complete absence of fat cells. All the available space was occupied by hæmopoietic cells. The overwhelming number of these were myelocytes, but lymphocytes and eosinophils were also numerous. A fair number of basophils was scattered throughout. Nucleated red cells, both megaloblasts and normoblasts, were present. Giant cells were very scanty.

Points of Interest.—The case is of interest, in the first place, because of its rarity. Granting that my search through the literature has been exhaustive, then this case is the nineteenth recorded authentic instance of myelocythæmia occurring in

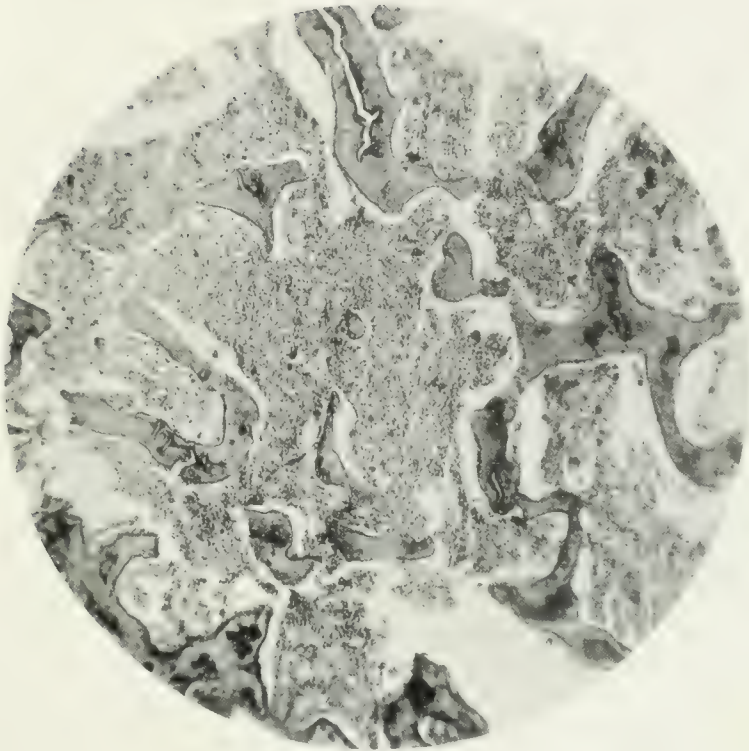


FIG. 1.

Transverse Section through the shaft of the humerus showing the thick bony strands and the absence of a defined medullary cavity and of fat-cells.

Hæmatein and Eosine. $\times 60$.

infancy, and the twentieth case of myelocythæmia occurring in an acute form at any age. The association of leukaemia with osteosclerosis is still more rare, and I have found only two previous cases. Heuck describes a case in a man of 24. The diaphysis of the femur and humerus had an unduly thick and hard cortical substance. The marrow cavity was very narrow, and was crossed by a fine network of bone containing fibrous tissue and marrow cells. The sternum and ribs showed a similar change. There were no large masses of marrow, and only small drops could be expressed. The skull was heavy, thick, and compact. Schmorl describes a case in a man of 28. The spongy bone was nearly all compact, even in the spine, epiphyses of the long bones, and in the sternum. The cells were typical of leukaemia, but there was great fibrosis of the marrow. It may be noted that both authors specially mention the fibrous tissue in the marrow. In the case now reported the fibrous tissue was practically invisible.

A point of interest and importance is the difficulty which was found in staining the myelocyte granules.

Ehrlich and his school insisted strongly on the distinction between lymphatic leukaemia, which they regarded as a disease of the lymphatic tissues, and myelocythæmia, which was regarded as a disease of the bone-marrow. Cases, however, were recorded in which there was a blood picture of lymphatic leukaemia without glandular enlargement, and the view came to be commonly held that all leukaemias were marrow diseases. Pappenheim and Hirschfeld have reported a case which they regard as lymphatic leukaemia of lymphatic origin, but this is an isolated observation in modern hæmatology.

The result of the present position is that there may be confusion of nomenclature. For example Zypkin publishes a case of acute myelogenous leukaemia with the following counts:—Leucocytes, 658,000; polymorphs, 1·5 per cent.; lymphocytes, 3·6 per cent.; eosinophils, 1·9 per cent.; basophils, 0·2 per cent.; myelocytes, 6·2 per cent.; pro-myelocytes, 16 per cent.; myeloblasts, 70·6 per cent.

Now one is far from denying that this was a case of myelogenous leukaemia, but the practical difficulty is this—While there is probably no doubt that the cells in such cases are undeveloped myelocytes in the physiological or ontogenetic sense, it is very difficult or even impossible in many cases to classify them as other than lymphocytes in the anatomical sense. The distinction between lymphatic and myelogenous leukaemia in the present state of know-

ledge must therefore turn on the existence or non-existence of neutrophil granules in the preponderating cells. Although Zypkin's case is recorded as one of acute myelogenous leukaemia, without denying its myelogenous origin I prefer to regard it as an example of acute lymphatic leukaemia, a much more common disease. What is uncommon is the occurrence of leukaemia with the preponderating cells differentiated as myelocytes running an acute course.

The distinction is not merely one of interest to the haematological expert, since we know that cases of acute lymphatic leukaemia are usually affected prejudicially by the use of X-rays, while judging from experience of X-rays in the chronic granular form benefit might be expected in the acute cases.

To sum up: A case of myelocythæmia in an infant of ten weeks is described in which a fatal termination occurred in three weeks. The case appears to be the third on record in which leukaemia has been associated with osteosclerosis. There was considerable difficulty in staining the myelocyte granules.

I have to express my great indebtedness to Dr. Fowler for asking me to see the case and for his kindness in handing it over to me for investigation and publication.

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ON DELIRIUM DUE TO BROMIDE: WITH NOTES OF A CASE.

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THE bromide salts are frequently used so indiscriminately in the treatment of various nervous and bodily disorders that their toxic properties are apt to be overlooked. It should always be remembered that their action is a cumulative one, and, furthermore, that certain people have an idiosyncrasy in regard to them.

Aldren Turner¹ quotes Laudenheimer as showing that an epileptic who took 150 grains of bromide salt daily for eight days excreted less than half the quantity ingested during that period. Laudenheimer showed in addition that no results followed the administration of bromide until an equilibrium was established between the intake and output. This is said to depend upon saturation of the body, and requires about 30 grains of bromide to be given daily for three or four weeks.

Casamajor² has recently given a short review of the present knowledge in regard to bromide poisoning, and symptomatically has differentiated two clinical groups—(1) general apathy and dulness; (2) delirium. The first form is much the more frequent.

Casamajor remarks that probably the delirious type is frequently overlooked owing to confusing symptoms. He describes the delirium as a true toxic one, with hallucinations, restlessness, fabrications, and paraphasia. With this delirium peculiar physical

signs are frequently associated, *e.g.* unequal, sluggish pupils, tremors, changes in the reflexes, thick speech, and unsteady gait. On account of such a combination of physical signs many cases have suggested the diagnosis of general paralysis.

O'Malley and Franz³ have reported a case of delirium due to the use of bromides which was uncomplicated by any definite mental disorder. In their case the delirium was characterised by disorientation, hallucinations—visual, auditory, and tactile, confabulations, confusion, and hebetude. The pupils were unequal and reacted sluggishly to light; the knee-jerks were exaggerated and unequal; there was slight suggestion of a Babinski sign on the left side, double ankle clonus, coarse tremor of the hands, and unsteady gait. The above physical signs at first suggested to O'Malley and Franz that the case was one of general paralysis, but later, when the examination of the cerebro-spinal fluid proved to be negative, and as in seven and a half weeks all the suspicious physical signs had disappeared, the relation of the case to one of bromide delirium became evident.

Hankeln⁴ has reported the case of an epileptic who soon after commencing to take bromide showed disorder of speech and writing, was confused, sleepless, and had many hallucinations of sight. His pupils reacted sluggishly, and his tendon reflexes were much exaggerated. On withdrawal of the bromides a rapid recovery occurred. Again in this case the physical signs brought up the question of general paralysis, but owing to the rapid clearing off of the physical signs, and the fact that the patient presented none of the characteristic general paralytic mental symptoms, that diagnosis could not be substantiated.

The case which I wish to report is somewhat complicated by the fact that from time to time the patient has had petit mal seizures. The relation, however, of the bromide which he was taking to the delirium seems to me to be sufficiently clear to warrant one in making the diagnosis of bromide delirium. Such cases, in comparison with the extensive use of the bromide salts, are rare, and are also extremely interesting from a symptomatological point of view.

CASE.—W. S., 35 years of age, married, butcher, was admitted to Royal Edinburgh Asylum on 9th March 1912.

Family History.—Negative for nervous or mental disease for three generations.

Personal History.—The patient had seemed quite strong and

healthy when a child, and developed normally. He received a good education and learned readily. After leaving school he started to learn his trade as a butcher, was successful, and latterly had a business of his own.

He married about 1900. His wife has had five miscarriages, and now has one healthy child, 1 year and 2 months old. He was always exceedingly temperate in the use of alcohol, and gives no history of any venereal disease.

History of Illness.—About one year after marriage (1901) the patient began to have attacks of petit mal. He had only two or three attacks and then remained free from any attacks until 1905. In 1905 he had one grand mal seizure in addition to several petit mal attacks. At this time he was advised to take a fish diet, and sodium bromide was prescribed in 15-grain doses, to be taken at night. Since then he has taken sodium bromide fairly regularly. He continued to work steadily, and remained free from any attack until about the first week of February 1912. Then he started to have a large series of petit mal attacks, and began to take sodium bromide quite indiscriminately. During the attack he would stop in the middle of speaking, his eyes would roll, and then in a moment he would resume speaking where he had left off. His wife has informed me that at this time she used to buy one ounce of sodium bromide every two days, and the patient continued with this treatment for nearly three weeks. He was thus getting about 240 grains per day. (Sometimes the ounce of bromide would only last for a day and a half.) Eventually he was noticed to get hazier and hazier, would fall to the floor as if the worse for drink, but no twitchings were noticed. He himself one day remarked, "I've lost my balance and can't hold anything." He next became very confused, and began to have visual and auditory hallucinations. For instance, during the day he would say that faces were looking in at the window, and on one occasion took up a stick and said he would hit them. Once or twice also he said he saw people fighting. He would often listen as if hearing voices, and would ask his wife if she did not hear so-and-so speaking. He talked in a confused way—accused his wife of hiring out the kitchen chairs for tea-parties. He complained of the fish and bread having a bad smell and taste—"his own breath was terrible," and his speech was noticed to be thick and indistinct. His wife thought, and made the remark, that the drug was making him much worse, and the doctor who was in attendance was of the same opinion. He was now removed to the Chalmers Hospital,

and while there is described as talking nonsense—said a man was waiting for his head, misidentified people, *e.g.* called an attendant John Eggo (a great friend). During the second night of his stay in the Chalmers Hospital he walked out of one of the windows, was taken to the ward for delirious patients in the Royal Infirmary, and later committed to this Asylum.

State on Admission.—He was dazed, confused, and extremely restless. He answered all questions quite relevantly, but at times had great difficulty in articulating clearly. He was happy, said that he felt “fine,” and expressed some grandiose ideas. A sample of his answers to questions is as follows:—“Do you feel happy?” “Yes, as happy as a lark—quite happy.” “Why?” “I’m getting a nice, comfortable, respectable (very badly pronounced) living, so what more can I want.” “Have you been sick?” “No, I’ve never been sick in my life.”

He stated (erroneously) that he had about £6000, that he expected to become a very wealthy man, that he was a better business man than most of his neighbours, that he possessed two butcher’s shops and one fish shop, although he only had one shop. He could not tell the day or the month, and called this place (Morningside Asylum) the Chalmers Hospital.

He misidentified those around him—called one of the attendants his father. His memory both for recent and remote events was very poor. Numerous glaring discrepancies occurred in his dates, but at this time it must be remembered that he was very confused. He said that he was born in 13,176 (1876); that he was now 27 years old (he was really 35); that he had worked first as a joiner for 15 years (actually a few months), and then as a butcher for 15 years, and that he had three children living, whereas he only had one. He could not tell where he had come here from, or how long he had been here.

His grasp on general information was very poor. He said King Edward was still King, and that Abraham Lincoln was now President of the United States. In doing simple calculations he got quite confused, said that $3 \times 14 = “336”$; $100 - 7 = “90”$; $90 - 7$ —he got quite confused and said “80 from 100 that’s 20.”

His power of retention of recent impressions was also very poor, as at the end of three minutes he had forgotten the physician’s name and a number containing three numerals. He had absolutely no realisation of his condition, denied that there was anything wrong with his head, and considered himself fit to work.

Physically he showed an intense bromide rash over his face and body; his tongue was thickly coated, and his breath extremely offensive. The pupils were slightly unequal; both were irregular, both reacted sluggishly to light but well on accommodation. His spontaneous speech was thick, and test words were distorted. He was unable to write such simple words as cat or dog (made an illegible scrawl), and when asked to write his name simply wrote "William S." in a very shaky way. The tendon reflexes were slightly exaggerated, especially on the left side. An ankle clonus was obtained on the left side, but on both sides the plantar response was flexion. The left side of the face was flattened, and the left arm and leg seemed slightly weaker than those on the right side; there was some tremor of the tongue, hands, and facial muscles.

He was very constipated, and stated that lately he had had difficulty in passing his urine, otherwise there was no disease of the internal organs.

A lumbar puncture was performed, but the cell count was negative; globulin reactions were partially positive; the Wassermann reaction was negative, both with the blood serum and the cerebro-spinal fluid (Dr. Winifred Muirhead).

Further Progress.—For the first few days following admission he was noted as restless and confused, misidentified those around him, and was extremely hazy for events preceding admission.

On 19th March 1912, a week after admission, he was noted as looking much clearer, but was still mentally confused. He said that he had been here for three weeks, and that he had come here directly from his own home. He had no recollection of having been in the Royal Infirmary, and stated that he had been taken to the Chalmers Hospital simply because he had been cleaning a window and had fallen, which was not the case.

He gave the date as 14th January (15th March), but he now realised perfectly where he was. His memory for remote events showed a considerable improvement, his power of retaining recent impressions had greatly improved, but he still had difficulty in doing simple calculations, *e.g.* $3 \times 14 = 36$; $93 - 7 =$, after a long time, "83." Physically, appreciable improvement had taken place. The bromide rash had to a considerable extent disappeared, and the breath was much less offensive. The pupils still reacted rather sluggishly to light, but better than formerly. His speech was now distinct, and writing was correct and legible. The left side of the face was still slightly flattened, the left hand-grip

weaker than the right, but there was no defect in gait, and the muscular strength in the two legs was about equal. The tendon reflexes were slightly and equally exaggerated, but no clonus could be elicited.

23rd March 1912.—The patient had now returned to his normal, and said that his head felt perfectly clear. He gave an account of his condition previous to admission, remembered having had hallucinations of sight and hearing, and recalled being taken to the Chalmers Hospital. From that time, however, until the time of his admission here he was quite amnesic. He remembered nothing of what happened in the Chalmers Hospital, had no recollection of being in the Royal Infirmary, or of his journey to this Asylum. His memory, power of retention, calculation, and grasp on general knowledge were now unimpaired. He had an excellent realisation of his condition. He now stated that he used to rebel at having to take the bromide when it was given him, as he realised that it was doing him harm by the fact that his stomach, bowels, and urinary apparatus got out of order. Physically he had cleared up completely. He had had no attack of petit mal during his hospital residence.

On 30th March the patient was discharged as recovered.

The case may be briefly summarised as a delirium characterised by confusion, hallucinations of sight and hearing, misidentification, restlessness, and retrograde amnesia.

Quite a striking feature in the mental picture was the grandiose trend, and that, associated with the physical signs, *e.g.* sluggish pupils, thick speech, difficulty in writing, exaggerated tendon reflexes, and tremors, made us think at first that the case was one of general paralysis. That diagnosis, however, can be quite ruled out from the fact that the examination of the cerebro-spinal fluid—except for a partially positive globulin reaction—was negative, that the Wassermann reaction with the blood serum was negative, and that such a rapid recovery took place both mentally and physically on withdrawal of the bromide.

It is interesting to note that the cases reported by Casamajor, O'Malley and Franz, and Hankeln have all raised the suspicion of general paralysis, and therefore the fact may be emphasised that sluggish pupils, thick speech, exaggerated tendon reflexes, and tremors are not uncommon accompaniments of toxic states.

The relation of the case to a post-epileptic state must also be

taken into consideration. The epileptic attacks, however, were all petit mal in type, and after each attack it was stated definitely by his wife that he seemed in his normal condition. Post-epileptic confusional or maniacal states seem to occur much more commonly after grand mal seizures, and do not show such frankly delirious features as were noticed in this case. Further, it was noted that it was only after he began to receive the excessive doses of bromide that any definite mental change occurred. These facts all seem to warrant one in believing that, although the mental disorder may have to a certain extent been aggravated by the epilepsy, it bore no close relation to it.

On the other hand the patient himself realised, owing to the disorder of his digestive and urinary apparatus, that he was getting too much of the drug, both his wife and the physician in attendance noted that under its influence he became more and more confused, and consequently two days previous to his admission to the Chalmers Hospital the drug was withdrawn altogether. The delirium which he showed corresponded to the type of true toxic delirium described by Casamajor, and the association of such a delirium with a marked bromide rash, offensive breath, thick speech, sluggish pupils, and tremors seems to prove conclusively that the case is one of delirium due to defective elimination of the bromide. No doubt the cumulative action of the bromide was materially helped by the constipated condition of his bowels and the disorder of his urinary organs.

In conclusion it may be stated that Aldren Turner, as a result of his extensive experience, has stated that unless benefit follows a daily dose of from 45 to 75 grains of one, or a combination of the bromide salts, some other remedy or method of treatment should be sought for and applied.

My thanks are due to Dr. G. M. Robertson, Physician-Superintendent of Royal Edinburgh Asylum, for permission to publish this case.

REFERENCES.—¹ Aldren Turner, "Epilepsy," *Brit. Med. Journ.*, March and April 1910. ² L. Casamajor, "Bromide Intolerance and Bromide Poisoning," *Journ. Neur. and Ment.*, vol. xxxviii. 1911. ³ O'Malley and Franz, "A Case of Delirium Produced by Bromides," *Gov. Hosp. Bull. Washington*, No. 1, 1909. ⁴ Hankeln, "Ein Fall von Brominismus," *All. Zeit. für Psych.*, vol. lxx. 1908.

SOAPS AND THEIR EFFECTS ON THE SKIN: AN
ANALYTICAL RESEARCH.*

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SOAPS have been in use from the very earliest ages. They are mentioned in the Bible, are alluded to by Pliny, and were found in the ruins of Pompeii. Dirt is always present, and in greater amount in these days of smoky factories and coal fires, and its removal has been found to be most easily and readily attained by the use of soap. The opinion generally held is that soap acts by forming an emulsion with the foreign matter and that the alkali acts on the fats. Whatever the beneficial results, there is no doubt that in many cases soaps produce a more or less severe irritation of the skin, and it was to find out wherein lay the source of this dermatitis that the present inquiry was instituted.

Many soaps on the market are vaunted as free from any irritant, some superfatted, some not, but one and all when mixed with water give a strongly alkaline reaction. Chemically it must be so; they are compounds of a strong base, soda or potash, and weak acids, *e.g.* stearic, palmitic, oleic, etc., and thus naturally give the reaction of the stronger side. In addition, when brought into contact with water, hydrolysis takes place, breaking up the compound and liberating the alkali. One fails then to see the value of adding extra fat, and in practice one has not found any benefit from this, except in so far that makers of superfatted soaps generally use very pure materials, which they can afford to do in a highly priced article. In carrying out the following experiments various soaps were used, but for obvious reasons the makers' names are omitted and only the type given:—

Five grammes of each sample were taken, and, to ensure fairness, this was cut so as to include outer, middle, and central parts.

Firstly, this was thoroughly incinerated on a weighed porcelain capsule and the weight of the ash then ascertained. The residue must, of course, contain as impurities all the alkali and insoluble inorganic matter which are added.

The ash was then taken and dissolved in about 500 c.cm. of distilled water coloured with phenol-phthalein, and titrated with

* From the Research Laboratory of the Royal College of Physicians, Edinburgh.

decinormal sulphuric acid until the colour disappeared. This test can only be regarded as comparative (methyl-orange is more commonly used nowadays and is more sensitive for this purpose), still it gives the comparison, which is what is wanted. Both the free and combined alkali are indicated, but this is of no significance, as what one wants to ascertain is the alkali freed when soap and water are mixed.

I may state that almost identical results are obtained if the soap is dissolved in hot water and not incinerated; incineration is, however, preferable, as the colouring matter of some brands often leads to complications.

The ash varies from 13·6 to 20 per cent., and the alkali from 4 to 7 per cent.

	Ash (per cent.).	Alkali (per cent.).
Soap for clothes . . .	14·1	4·0
" " " " "	...	4·2
" " " " "	18·4	6·7
" " " " "	19·0	7·0
Common bar soaps . . .	13·6	4·2
" " " " "	14·0	7·6
" " " " "	16·0	6·3
" " " " "	15·8	6·0
Soap powder . . .	18·4	6·9
Buttermilk soaps . . .	17·6	4·24
" " " " "	17·3	6·97
" " " " "	18·0	4·8
Superfatted soaps . . .	17·2	4·7
" " " " "	17·4	6·4
" " " " "	17·2	5·5
" " " " "	17·0	5·9
" " " " "	18·4	6·5
" " " " "	20·0	6·5
" " " " "	14·0	6·0
Toilet soaps . . .	13·8	5·0
" " " " "	14·0	5·1
" " " " "	16·8	6·5
" " " " "	16·8	7·2
" " " " "	17·6	6·7
" " " " "	16·2	6·3
" " " " "	16·6	5·8
Brown windsor . . .	17·4	6·6
" " " " "	18·0	6·5
Castille soap . . .	17·8	6·3
Tar soaps . . .	15·8	6·3
" " " " "	17·3	5·9
Carbolic soap . . .	16·6	6·65
Sulphur camphor soap . . .	16·0	5·7
Soft soap . . .	14·6	5·7

These figures are interesting as showing that among the dearer toilet and superfatted soaps the proportion of mineral ash and alkali is at least as high as in the coarser types, and if we take into account that the former are also harder, and therefore contain less moisture, the account against them in this respect is still heavier. When an alkaline solution such as that of soap comes into contact with the skin there is induced an excessive secretion of the acid sebum and sweat, and a solvent or softening effect on the protective epithelium is also produced.

So far, the irritant effects of all soaps, and according to the above, cheap and dear, coarse and fine, are equally capable of causing these results, but as some are undoubtedly worse than others, wherein lies the difference? Let us follow up all the constituents to get at the root of the matter.

Rosin, up to 20 per cent. and more, is used to produce a hard soap. It is not so much used now as in former years, and from tests applied to my own skin I do not think it has much effect as an irritant. If impure and not properly freed from turpentine it may have some significance.

The following experiments were done:—

- A. 1. Absolute alcohol was rubbed into the left arm for five minutes and allowed to dry; and
- 2. Absolute alcohol saturated with rosin was rubbed for five minutes into the corresponding part of the right arm and allowed to dry. No effect followed in either case.
- B. 1. Decinormal solution of soda was rubbed for one minute into the left arm (a painful process);
- 2. Decinormal solution of soda saturated with rosin was rubbed into the corresponding part of the right arm for one minute. Dermatitis lasting five days resulted in both cases, but the arm to which rosin was applied was, if anything, less affected.

Impurities.—These are not of so much importance from our point of view. Sulphate and silicate of soda, alum, potato flour, starch, China clay, Fuller's earth, and glycerine are among the most common, and are not powerful irritants. Glycerine loses its hygroscopic effect when mixed with water.

Paraffin and benzene derivatives are added to soaps for special purposes, and if they were kept for these purposes little harm would result, but unfortunately hands and faces suffer where the clothes benefit. Medicated soaps contain about 10 per cent. of the active ingredient—*e.g.* carbolic acid, naphthol, resorcin, sali-

cylic acid, sulphur, tar, etc.; in the case of mercurials it is $1\frac{1}{2}$ per cent. These figures may vary, but they are a good average; their effects will be considered later.

Transparent soaps are made with methylated spirit about 20 per cent., to which are often added glycerine and sugar 10 to 20 per cent. Floating soaps are either aerated or mixed with cork chips.

Fats and Oils.—These are tallow, lard, bone grease, palm-oil, palm nut oil, cocoa-nut oil, olive oil, cotton-seed oil, linseed oil, castor oil, corn-oil, cocoa-butter, rape-oil, whale-oil, and recovered greases. Where large quantities of cheap soaps are to be made it is a well-known fact that the makers buy any odd parcel of fat that crops up cheap on the Mincing Lane market. Rancidity is of course a likely occurrence, and a putrescent fat means a bad soap. Tallow, lard, cotton-seed oil, olive oil, bone grease, and recovered greases are the most commonly used fats that become rancid.

Saponification values, which indicate the quantity of alkali required to saponify the various fats and oils, are worthy of consideration—

Cocoa-nut oil requires 25·0 to 26·0 per cent. of KOH.

Cotton-seed oil	„	19·5	„	„
Tallow	„	19·0 to 20·0	„	„
Olive oil	„	19·1 to 19·6	„	„
Palm-oil	„	20·2	„	„
Palm nut oil	„	24·0	„	„
Linseed oil	„	18·9 to 19·3	„	„
Castor oil	„	17·8 to 18·0	„	„
Corn-oil	„	18·4 to 19·0	„	„
Rape-oil	„	17·25	„	„

This may be of importance, as, for instance, in the case of cocoa-nut oil soap, where the larger amount of alkali used is likely to produce a corresponding increase in the irritating effect.

Hydrolysis figures show the amount of free alkali given off when soap is mixed with water.

The figures given by Hurst are estimated as the percentage of the total alkali in the soap—

Soap made from Stearic acid	. . . . .	3·5 per cent.
Palmitic acid	. . . . .	3·75 „
Cocoa-nut oil	. . . . .	7·1 „
Pure oleic acid	. . . . .	6·65 „
Castor oil	. . . . .	4·3 „
Palm-oil and tallow	. . . . .	5·3 „
Tallow and rosin (primrose)	. . . . .	5·3 „
Cotton-seed	. . . . .	9·5 „

Taking these two tables into consideration, it might naturally be expected that if we have soaps made from fats that require much alkali to saponify them and also give off much free alkali when mixed with water, they will have a more irritant effect on the skin.

It may not be quite scientific, but if the two figures (saponification and hydrolysis values) are multiplied together we may get some comparison as to their irritating capacity—

Cotton-seed oil	=	19.5	×	9.5	=	185.
Cocoa-nut oil .	=	25.5	×	7.1	=	182.
Olive oil .	=	19.4	×	6.65	=	129.
Tallow—30 per cent. oleic and 70 per cent. stearic	=	19.5	×	4.4	=	86.
Palm-oil .	=	20.2	×	5.0	=	100.
Castor oil .	=	17.9	×	4.3	=	77.

I have taken the commoner soaps, and of these castor oil soap is, according to the figures, the least irritating; the soap it yields is, however, very soluble, therefore very wasteful, but, above all, is apt to become rancid.

Tallow soap used to be more freely used; it has a low irritating value, keeps well, and is hard and not wasteful. It is often now adulterated by cheaper oils and fats.

Olive oil soap, which was the original Marseilles or Castille soap, is hard, lathers freely, and has no smell. It is a little more irritating according to the standard given, and it is often adulterated.

Palm-oil soap is hard, does not go rancid, and lathers well. It has a high irritating value. Formerly it was much in vogue as a cheap soap, but it is largely displaced by the next two.

Cocoa-nut oil soap is more irritating still. It forms a white, good lathering soap, which works well in salt water, but may become rancid.

Cotton-seed oil soap has the highest irritating value. It is very wasteful, lathers freely, readily becomes rancid, and has a marked odour, but is very cheap.

If my deductions are correct we have probably a reason for the bad effects of modern domestic soaps of the cheaper and clothes-washing kinds, as they are made mostly from cheaper fats and the last two oils. Formerly tallow and olive oil were more used, and still are no doubt in the dearer classes of soaps, and then the evil effects were not so pronounced. No one can be in touch with the out-patient department of a large hospital and not observe the economic loss, not to speak of physical damage, incurred by

the employment of soaps and soap powders now so much to the fore. If hands were considered as well as the clothes, and more of the old-fashioned joint oil pressed into service, the results would tend to lessen this serious and increasing occupation dermatitis.

Antiseptic Power of Soaps.—Although in most scientific circles this is considered to be of no value, yet every now and then, especially in midwifery treatises, one finds that it is still taught that soap is antiseptic.

Many disinfectant soaps are also on the market, and although I have been clinically impressed with the increase in the irritating power, I have never seen evidence of this advertised bactericidal strength. To elucidate the points, the following experiments were carried out:—

To fix a standard I first ascertained that with water 2 per cent. of soap forms a solid jelly.

Cultures were first made on agar-agar, to which 2 per cent. of the various soaps were added, controls being inoculated at the same time. As soap is more active when mixed with water, I then repeated similar experiments with broth cultures.

The organisms tried were *Bacillus typhosus*, *Bacillus coli*, *Staphylococci albus* and *aureus*, and *Sarcina lutea*.

The soaps used were scented and unscented toilet, clothes-washing, common bar, brown windsor, superfatted, tar and carbolic, soft, and green soft soaps.

With one or two exceptions growths were obtained in all these. *Sarcina* grew in all, staphylococci in all, but very poorly in the case of carbolic; *B. typhosus* and *B. coli* failed in isolated cases.

As 2 per cent. is much stronger than is actually used in a daily wash, the following experiment was carried out to ascertain what this percentage should be:—

A cake of buttermilk soap, very hard and dry, was taken, weighed, and found to be 87·3 grms. Two litres of very hot water were put in a basin and then this cake was used to scrub the hands with for about 3 or 4 minutes, a nail brush was also used, and at the conclusion there was a very thick lather. The cake was then dried and weighed, and found to be 84·9, indicating a loss of 2·4 grms., which in two litres of water gives a percentage of 0·12 in what was a very thorough wash. Another experiment was done similarly with a cake of soft bar soap, and the percentage was then found to be 0·13.

I then allowed a wide margin, and made culture media containing 0·2 per cent. of soap. Agar and broth tubes were used, and

the soap was carefully powdered and incorporated under high temperatures.

Controls were simultaneously inoculated, and the resulting growths on the soap media were examined by staining films and also by subcultures. In every case staphylococci (the only organism tried) grew. Biniodide, sulphur, carbolic, soft, superfatted, clothes-washing, and other six ordinary soaps were the ones experimented with.

A summary of conclusions may be—

1st. All soaps, from their chemical constitution, must be irritant to the normal skin.

2nd. The effect varies with the individual skin, and is more pronounced in senile and diseased skins.

3rd. Cotton-seed oil and other and rancid fats are probably largely responsible for the irritant effects in cheaper soaps. They are much more commonly used now than in former years. I fancy that the first mentioned is, uncombined, a skin irritant, but this is a matter for further inquiry.

4th. The bactericidal power of soaps is *nil*, and even when combined with antiseptics they are of no value as germicides.

5th. There may be some reason for the introduction of such substances as sulphur and ichthyol into soaps because of their effects on the glands and blood-vessels of the skin, but, clinically, antiseptics, and, above all, carbolic acid, increase irritation.

6th. There is no scientific basis for the addition of extra fat to soaps, as when soap is mixed with water the alkali freed will at once unite with the superfluous fat.

7th. Rosin and impurities have no significance from the present standpoint, but paraffin and benzene derivatives, when incorporated with soaps for cleansing purposes, increase the harmful effect on the skin.

8th. The minimum of soap should be employed, and well washed off.

I acknowledge my indebtedness for some facts and figures to *Soaps*, by Geo. H. Hurst, and *The Art of Soap Making*, by Watt.

INSUFFICIENT DATA AS A CAUSE OF FAULTY
INTERPRETATION OF RADIOGRAPHS.*

By ARCHD. M'KENDRICK, F.R.C.S.,

Medical Officer Jointly in Charge of X-Ray and Medical Electrical Department,
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SEVERAL sets of circumstances are responsible for the title of this paper. If it does nothing else it will show the disadvantages which may result from our modern methods of specialisation. Unfortunately this tendency towards extreme specialisation is accompanied by an increasing dissociation and lack of inter-communication between those engaged in the various branches, which, when taken together, go to make up the whole domain of medicine and surgery. Radiography is of fairly recent origin, and its divergence from the mother subjects is perhaps the more conspicuous on that account.

In fact, we are at a critical point in its history, and it must soon be settled what the true position of the radiographer really is in relation to diagnosis. Is he to be merely an expert X-ray photographer, whose duty is at an end after he has furnished the physician or surgeon with the finished negative, or must he be at once an anatomist, a pathologist, and a radiographer, capable of assisting his colleagues in diagnosis?

Most assuredly the latter is the only means by which the full benefits of radio-diagnosis can be attained. As a concrete example of this, radio-pelvmetry might be quoted.

The Maternity Hospital staff are now sending some of their patients to the radiographer for measurements of the internal diameter of the pelvis. These radiographs are taken under certain anatomical and mathematical conditions.

Now, any such radiograph is of no value to the obstetrician, even although he may possess an X-ray pelvimeter or skiameter, because he has not the necessary anatomical and mathematical data to enable him to apply the radiograph to the pelvimeter. In other words, he does not know the exact conditions under which the radiograph was taken. This absence of data obtains in nearly every radiograph supplied to the physician and surgeon at the present day, and is the most fertile source of inaccuracy in radio-diagnosis.

* Read before the Edinburgh Medico-Chirurgical Society, 1st May 1912.

At a recent meeting of this Society Mr. Stiles said, in reference to radiography of the stomach, that surgeons are more frequently misled than helped by it. One cannot refute the statement of such an authority, and, personally, I would like to take the opportunity of thanking him for pointing out that there is something wrong somewhere. It is worth pondering over, for X-rays are so mathematically exact in their projection that radiographic pelvimetry is possible. Why, then, should radiography of the stomach ever mislead the surgeon?

It cannot be accounted for on the grounds of faulty interpretation: it is not always due to faulty technique on the part of the radiographer, but is the direct result of a want of collaboration with its consequent insufficiency of data.

The fault is divergence of specialisation; but, let the surgeon or physician and the radiographer mutually furnish sufficient anatomical, pathological, and mathematical data, and the fault will disappear. Radiography would then become an absolutely reliable diagnostic acquisition.

This winter, in the Royal Infirmary, Mr. Struthers has aimed at obtaining more data than usual from the X-ray department, in reference to certain shoulder conditions which he is at present investigating. This has been of great mutual benefit, and has added further proof of existing insufficiency of data, and of the necessity for collaboration.

Along with my colleague, Dr. Hope Fowler, I am diagnosing and classifying all the radiographs taken in the electrical department of the Royal Infirmary, with the view to establishing in that institution a reference library of X-ray photographs.

During the past six months we have taken over 3000 X-ray photographs, and have thus had ample opportunity of forming an opinion on the deficiency of existing methods. The diagnosis of many of the plates is impossible on account of the insufficiency of data supplied to us by the surgeon, and on account also of the inefficiency of our record of radiographic technique at the time of taking the photograph.

It is with the object of increasing radiographic data that this paper is written; but in the time at my disposal I can only indicate the nature of, and the broad lines on which we may obtain, such data.

The surgeon knows what he wants, but does not, as a rule, know how his object may be attained radiographically. The radiographer can help him in this if the surgeon would confer

with him, and the following points, if noted, will help in their mutual work:—

A skiagraph is only a shadow picture, and is subservient to many factors.

Firstly, with regard to the tissues to be radiographed. X-rays penetrate different substances approximately in inverse ratio to their specific gravity—the higher the specific gravity the greater the opacity to X-rays. The harder the X-ray tube the more penetrating are the rays given off from it.

From these two facts it will be easily seen that if the surgeon wishes, for example, a skiagraph of a joint, it will be to his advantage if he advises the radiographer whether he suspects synovial or bone mischief, for then only will the radiographer be able to select a tube suitable for the case. A soft tube is required for showing structures of such low specific gravity as serum (sp. gr. 1035) or blood (sp. gr. 1055), whereas a harder tube is required if the structure of bone must be shown.

Secondly, with regard to the position of the limb. If we take, for example, the hip joint, the degree and direction of rotation of the femur when the radiograph is taken modifies to an astonishing degree the apparent anatomical relations of the parts. The neck looks long and thin if the limb be in slight internal rotation. The neck may appear thick and short in extreme rotation in either direction according to the selected focus point of the tube. If the thigh is flexed the radiographic appearance may be that of coxa valga. The epiphyseal lines about every joint are very misleading in the various positions.

Thirdly, with regard to the position of the X-ray tube. The absence of data regarding this is perhaps the commonest cause of faulty interpretation of medical and surgical radiographs. Normal stomachs are diagnosed as dilated or displaced, bones are diagnosed as dislocated, and fractures in malposition when the focus point is inappropriately chosen or not recorded. This should not be, for so-called distortion is mathematical, and can be easily calculated provided we have sufficient data regarding the focus point of the tube.

Such data can be supplied by the radiographer. If the relative position of the focus point and the plate be known, and the distance of the organ or structure from the plate be also known, the actual measurement of the organ is easily accomplished. By a collaboration of surgeon and radiographer most of our present pitfalls would be obviated.

With regard to the selection of the X-ray tube in a special case, let the surgeon advise the radiographer as to the probable diagnosis, and the radiographer will select an X-ray tube suitable to show the tissue or structure required. With regard to the best position of the limb and the selection of the focus point, one cannot at present lay down any golden rule, because up till now there has been insufficient collaboration. The question is not yet decided, but before long we may have established a series of "normal positions" and "normal focus points" to be adopted in every ordinary radiograph. It will then be possible to compare various radiographs, for, after all, our diagnosis is based on a comparison with the average.

In any case the surgeon should be supplied with the following data, viz.: — (1) The position of the limb, and (2) the relative position of focus point and plate at the time of examination.

In private I have adopted the practice of recording the focus point and its distance from the plate, and also the position of the limb during the examination. This at least gives the surgeon a little more diagnostic data than hitherto.

Regarding "normal positions" and "normal focus points," I hope in the near future to lay before my medical and surgical colleagues a series of these normal points. By a consideration and criticism of these we may eventually be able to establish a standard series of normal points and positions, and thus attain the fullest benefits which radiography can offer as a diagnostic aid.

CLINICAL RECORDS.

CASE OF TABES, WITH SEVERE GASTRIC CRISES OF MANY YEARS' DURATION, IN WHICH SECTION OF THE POSTERIOR NERVE-ROOTS HAS PRODUCED COMPLETE RELIEF.

By DR. BYROM BRAMWELL

and

PROFESSOR ALEXIS THOMSON.

THE case which Professor Alexis Thomson and I are desirous of bringing before the Society is one of tabes, in which very persistent and

severe gastric crises have been completely relieved by division of the posterior nerve-roots. We only intended to make this a brief communication, intending it to come at the end of Dr. Russell's paper, and to occupy a few minutes; I must ask you therefore to excuse me if the communication is much shorter than you might have anticipated.

The patient is a man, now aged 33, a jockey by occupation, whom I have had under observation for a number of years—I showed him at a previous meeting of this Society.

The patient enjoyed perfect health until 1901, when he contracted a hard chancre. It was long in healing, and was not, he says, followed by any secondary symptoms, but there can be no doubt, I think, that it was a true syphilitic chancre. That is an important point in the case.

Ten months after the primary sore he began to suffer from attacks of pain in the stomach and vomiting, and these attacks have continued to recur with increasing severity until the time of the operation, to which I shall presently refer in detail, was performed.

Now the occurrence of the first symptom of tabes within ten months of the primary sore is very unusual, indeed, so far as I know, unique, and the development of tabes at the age of 24 is a most unusual feature—the early age at which the disease developed was of course due to the short latent period between the chancre and the first symptoms.

It has been suggested to me that perhaps this was a case in which there was hereditary syphilis, and that it was not such an interesting case as it would appear to be; but there is no ground whatever for believing that he is the subject of hereditary syphilis. He presents none of the stigmata of hereditary syphilis. He had been perfectly healthy up to the time when he contracted the chancre. The family history is very good—father and mother, aged about 56 and 54 respectively, are alive and in excellent health; 3 brothers, aged 35, 23, and 18, and 2 sisters, aged 36 and 27, all in the best of health; there have been no deaths in the family, and his mother had no miscarriages. Neither in the family history nor in the man's personal condition is there the slightest suspicion of congenital syphilis.

We may take it, then, that the first symptom of tabes developed within ten months of the primary sore. A year after the gastric crises he began to notice his sight becoming dim, and that gradually increased until he became completely blind five years ago. A year after the sight became affected he began to suffer from severe lightning pains in the legs, and these pains continued until the operation was performed. The bladder became affected; the knee-jerks and Achilles-jerks were absent; the pupils showed the Argyll-Robertson condition; there was well-marked thoracic and ulnar analgesia. Charcot's disease of the right knee-joint developed. Up to the time that he became completely

blind there was comparatively little ataxia, but after he became completely blind he became extremely ataxic—it is one of the most extremely ataxic cases of tabes I have ever seen—and the lightning pains and other symptoms greatly increased in severity.

Now this is another interesting point, because it was stated by Benedikt of Vienna that the development of optic atrophy in cases of tabes arrested the progress of the disease, that in cases in which optic atrophy was an early symptom ataxia was not developed and the lightning pains became less marked. That is not my experience. I have seen and reported several cases in which patients became extremely ataxic after blindness developed. In many cases, at least, optic atrophy does not have a retarding influence on the disease; one might as well say that the lightning pains have a retarding influence, because in many cases in which lightning pains are prominent no ataxia is developed.

Another very interesting feature of the case is that lumbar puncture showed no abnormality in the spinal fluid. On 20th October 1910, there were only six lymphocytes to the field of 450 diameters, and the albumen was not increased; and on 5th October 1911, there were only eight lymphocytes to the field and the albumen not increased. This is a very interesting point, for it has been claimed that an excess of lymphocytes and an increased quantity of albumen is perhaps the most constant sign of tabes.

On 21st September and 5th October 1910, and on 5th September 1911, the Wassermann reaction was found to be negative.

Well, this man presented all the characteristic features of tabes—indeed one very rarely sees a case in which all the symptoms and signs are so well developed as they are in this case—but it is to the gastric crises that I want particularly to refer.

The gastric crises occurred within ten months of the primary sore, and they continued to recur at irregular intervals until March last (1911). The patient never went for longer than nine weeks without a gastric crisis—sudden violent stomach derangement, obstinate sickness going on for days—his last attack lasted for eighteen days—nothing would lie on the stomach. He became extremely emaciated during these attacks, passed little or no urine, had pain and great distress. He was treated with various remedies, and lately we had to give increasing doses of morphia, and even these did not give complete relief.

Under these circumstances I asked Professor Alexis Thomson to divide the posterior nerve-roots, representing the sensory nerves, distributed to the stomach. This was done on 17th March of the present year (1911).

Professor Alexis Thomson is unfortunately prevented from being present this evening, but he has sent me the following brief note of

the operation, which was performed on 17th March, Mr. George Chiene being present:—

“GASTRIC CRISES OF TABES: FOERSTER’S OPERATION.

“R. C., aged 32, jockey, admitted 16th March 1911, from Dr. Byrom Bramwell.

“His case is peculiar in that his tabes developed within 12 months of the primary lesion of syphilis. He is totally blind from optic atrophy, and has got a Charcot joint in his right knee. The last time he was readmitted to Bramwell’s wards he was suffering from thrombosis in the veins of the leg.

“*Operation, 17th March 1911, with George Chiene.*—He took the anæsthetic very badly, crowing like a French railway whistle, and then when turned over on his face his breathing stopped, and he was only kept going with the greatest difficulty by the skill of Dr. Ross.

“The spinous processes had been marked out with silver nitrate by the house-surgeon, and I made two scratches right across the back at the level of the 6th and of the 9th dorsal vertebræ. The rectangular flap was then raised, the muscles cleared, and the lamina divided, partly with Doyen’s saw, partly with Horsley’s forceps. Very little blood was lost, largely, I have no doubt, owing to his collapsed condition. When the dura was opened the cerebro-spinal fluid escaped under considerable pressure; there were filmy adhesions between the dura and the cord, evidently the result of posterior meningitis. This made the demonstration of the nerve-roots a little more difficult. Finally four pairs of nerves (7th to the 10th inclusive) were satisfactorily resected, some to a centimetre, others to a centimetre and a half. It was difficult to work with them, they were so thin and delicate. The dura was then stitched up and the muscles in successive layers; a strip of rubber dam introduced through a separate opening.”

The wound took a long time to heal, no doubt due to the low vitality of the patient, but since it has healed he has remained absolutely well. It is now seven months since the operation, and he has not had a single gastric crisis, whereas for seven years before he has never gone for more than 7 or 9 weeks without a crisis, usually they were more frequent. (15th May 1912, the patient remains quite well; there has been no gastric crisis since the operation—a period of fourteen months.)

Another interesting point is that since the operation he has completely lost the lightning pains in the legs. This is difficult to explain, and it would almost appear that the operation has had a psychological

effect, and that has prevented the recurrence of the lightning pains. Of course one may say, if that is so, why is the relief of the gastric crises not merely psychical too? That is perhaps a possibility, but it is not a probability.

So far as I know, this is the first case in which this operation has been performed in Scotland, and I must say from the great success which has attended it in this case I should be inclined to urge it in some other cases of the same kind—obstinate and severe gastric crises which are not amenable to medical treatment. I have seen some other cases of the same sort; I was speaking to the doctor of one of these patients, and he told me the patient had become a morpho-maniac.

Since the operation this patient's general health has greatly improved, as one might naturally expect; and he says, and the nurses in the Infirmary confirm this, that he walks better. He certainly gets about better by supporting himself with his arms, but I cannot say myself that I see much improvement in the ataxia:

TRANSPLANTATION OF APONEUROSIS IN A CASE OF INGUINAL HERNIA.

By D. P. D. WILKIE, F.R.C.S.,
Assistant Surgeon, Leith Hospital.

THE experiments of Kirschner clearly showed that tendon, aponeurosis, and fascia lend themselves readily to successful transplantation.

The following case illustrates the application of his methods to the human subject:—

P. J., æt. 34, dock labourer, had always been troubled with “weakness” of his abdominal wall. For some months he had noticed a swelling in the left groin, and this had gradually been increasing in size and had latterly incapacitated him for work. He was admitted to Leith Hospital on 7th September 1911. On examination he was seen to be a thin man with very poor muscular development, particularly in regard to his abdominal wall. When he strained, the entire lower half of his abdominal wall bulged forwards. On the left side there was a large scrotal hernia and a wide and lax abdominal ring.

Operation.—Under chloroform anæsthesia the hernial sac was freed, ligatured at its neck, and removed. The abdominal muscles were unusually thin and flabby. An attenuated conjoined tendon was sutured down to Poupart's ligament over the cord. This gave little security, however, and the external oblique was so thin and friable that it was obviously of little value as a supporting structure unless reinforced in some way. Accordingly the outer side of the upper third of the thigh was shaved, painted with iodine, and a vertical incision

three and a half inches long made over the upper half of the fascia lata. From the aponeurotic portion of this structure a piece two and a quarter by one and a quarter inches was excised and the wound closed. The excised portion of aponeurosis was then let in under the external oblique in the anterior wall of the inguinal canal and fixed in position by stitches, the edges of the external oblique being sutured over it. The wound healed *per primam*, and the patient left hospital three weeks after with a firm cicatrix. Seen six months later the cicatrix was firmer than ever and was the strongest part of his abdominal wall.

MEETINGS OF SOCIETIES.

Edinburgh Medico-Chirurgical Society.

A MEETING was held on 1st May, Mr. J. M. Cotterill, President, in the chair. Professor Frederick C. Shattuck of Harvard University was elected a corresponding member of the Society.

Mr. Wallace showed a woman, 60 years of age, after *partial oesophagectomy* for squamous epithelioma. There had been a history of difficulty of swallowing and pain for four months. Laryngoscopic examination revealed an irregular "pasty wall cancer" at the upper end of the œsophagus. The larynx was not involved, and there was no glandular enlargement. Mr. Wallace referred to four previous cases of œsophagectomy. Three had done well, but in the fourth it had been impossible to pass a bougie and a second stricture was discovered at the operation.

Mr. Cathcart showed a patient after removal of *gall-stone acting as a ball valve at the neck of the bladder*. The chief symptoms were a constant pain, with frequent severe spasms shooting to the back. No jaundice. A large stone lay at the neck of the gall-bladder, grasped by the wall. It had allowed bile to enter the gall-bladder, but had hindered its exit. Owing to prolapse of the liver the gall-bladder lay near the umbilicus.

Mr. Cotterill showed a female patient in whom the *upper three-fourths of the radius had been removed for sarcoma* after amputation had been refused. Recurrence had taken place in the region of the neck of the scapula four months later and it was proposed to remove the entire upper extremity. Mr. Cotterill referred to his experience with Coley's fluid, and said that out of some twenty cases he had only seen benefit in one. In that case a large mediastinal tumour causing cyanosis had disappeared.

Dr. Torrance Thomson exhibited a *mask for administering chloroform or ether* by the open or semi-open method, with an adjustable dropper.

Dr. Goodall read a paper on "*Acute Myelocythemia*" associated with osteosclerosis and other unusual features occurring in an infant, which appears on page 500.

Dr. J. S. Fowler referred to the rarity of the condition in children and the comparative frequency of the lymphatic form. He had found Jenner's stain difficult to manage and thought that the triple stain was more reliable.

Dr. M'Kendrick read a paper on "*Insufficient Data as a Cause of Faulty Interpretation of Radiographs*," which appears on page 521.

Lantern slides of a radio-pelvimeter designed by the author were shown. Dr. Rainy said that if the positions of two bony points were marked it was possible to tell the size of any organ. In many cases the orthodiagraph was of more service, but it was not so widely available.

Mr. Stiles said that the surgeon and the radiographer might learn a great deal from each other. X-rays in many cases did not show what the surgeon found. He quoted a case in which the X-rays showed what appeared to be a greatly distended stomach, but the case was one of adherent and kinked appendix. He had removed a portion of the first rib under the impression given by the X-rays that he was dealing with a cervical rib. The mistake was a fortunate one since it cured the patient. Many cases of pressure on the first dorsal nerve were caused by the first rib and not by a cervical rib. Mr. Wallace said he had had precisely the same experience in a case of paresis due to an alleged cervical rib.

The President questioned whether it was advisable to tell either a radiographer or a pathologist anything of the clinical facts when he was asked for a report.

Dr. M'Kendrick, in reply, said the radiographer must be told what was wanted in order that he might select a suitable tube.

Edinburgh Obstetrical Society.

THE sixth meeting of the session was held on Wednesday, 8th May, Dr. Haig Ferguson, President, in the chair.

Specimens were shown by Dr. B. P. Watson for Dr. Barbour, and by Dr. Wm. Fordyce.

In a communication entitled "The History of Two Groups of Fibroids," Professor Sir Halliday Croom gave a description of two patients of whose whole history he was in possession. The women, B. and G. M., were twins, born in 1858, so much alike that their mother could scarcely distinguish them. They menstruated for the first time on the same day when they were 13, and continued normally till they were 30, when, in both, the periods became very profuse. In 1894 they both came under Sir Halliday Croom's charge. Barbara, afterwards Mrs. F., had constant hæmorrhage. A submucous fibroid was diagnosed and treated by electricity, with the result that it became pedunculated and was expelled spontaneously into the vagina. Periods, however, continued profuse, and she was sent into Edinburgh Royal Infirmary. She was then 37, sterile, had been married 7 years and been 5 years a widow. She had had attacks of acute uterine dysmenorrhœa which, along with the blood loss, caused fainting attacks at each period. The uterus was found to be enlarged to $3\frac{1}{2}$ ins., and to have intimately associated with it a large hard solid mass which filled up the pouch of Douglas. The body and cervix were pushed up above the pubes. The diagnosis lay between a solid sessile ovarian tumour and a fibroid tumour. On the abdomen being opened a fibroid adherent to the posterior surface of the uterus was found jammed in Douglas's pouch. The method then in vogue of removing the ovaries for the treatment of fibroids was attempted. One ovary, which was cystic and accompanied by

hydrosalpinx, was successfully removed, but the other, which was small and atrophic, was too firmly adherent to the uterus and had to be left. The operation was followed by some lessening of the menorrhagia, and from then until she was 50 she was able for her usual duties, with occasional periods of treatment in hospital for profound anæmia. At 50 she had an uneventful menopause, and enjoyed excellent health for 4 years. Then in November 1910 she developed pain in her back with occasional discharge of blood-stained fluid. In April 1911 she was admitted to the Infirmary under Dr. Haig Ferguson. A preliminary scraping showed "adeno-carcinoma" of the most typical type. Hysterectomy was performed, but she died a few days later. The specimen showed the great enlargement of the uterus to be due to a large number of fibroids of varying sizes, mostly submucous and a few interstitial. On microscopical examination there was marked round-celled infiltration of several of the fibroids, especially well marked in one where there was commencing necrosis.

Georgina, æt. 40, was admitted to the Royal Infirmary for hæmorrhage which, as in the case of her sister, had commenced at 30, and continued steadily since. A nodular fibroid tumour could be felt extending to midway between the umbilicus and pubis. Abdominal section was done and both ovaries removed. She made an excellent recovery, and soon afterwards married and went to Singapore. The periods went on regularly in spite of the double oöphorectomy, until at 50 she also had an uneventful menopause. Two years later, having returned to Glasgow, she developed acute pain in her back with blood-stained discharge, and went into Glasgow Royal Infirmary under Dr. Munro. She was found to have a group of fibroids, reaching as before to midway between the pubis and umbilicus. She was profoundly anæmic, and on account of her exhausted condition operation was impossible. She died in October 1910. On post-mortem the uterus was found to be the seat of a group of fibroids, one of which was sloughing. There was well-marked adeno-carcinoma of the body, and one fibroid was secondarily affected.

In discussing the points of interest of the foregoing cases Sir Halliday Croom said the women were evidently uniovular twins and therefore pathological. This was borne out by their remarkable likeness to each other, both physiologically and pathologically. The cases also illustrated the stages during the last 3 decades through which the treatment of fibroids had passed, viz. electricity and the removal of the ovaries. The futility of the removal of the ovaries was strikingly shown, in the first case by the difficulty of removing both, and in the second even when they were removed it had little effect on the tumours themselves. The later development of adeno-carcinoma of the uterine body secondarily affecting the tumours in both women was very remarkable, especially as the association of adeno-carcinoma with myomata was not common. It was said to occur in 1·7 per cent. of fibroids, and even in these it was extremely rare to have the growth invading the myomata. Cullen only found this occurring twice in his collected cases. In Sir Halliday Croom's 15 years of Infirmary work he only met with one case of adeno-carcinoma of the body of the uterus complicating fibroids, but he met with one well-marked case where there was malignant disease of the cervix and a group of small interstitial fibroids of the body of the uterus. Only once did he meet with a malignant degeneration of fibroids which was sarcomatous. Of course during these years hysterectomy was seldom performed, and deaths

from fibroids being rare then as now, opportunities for examination of a myomatous tumour were not so frequent. Primary carcinoma of the body of the uterus was almost invariably associated with sterility, and where fibroids were also present impregnation was still further prevented. Between 50 and 60 was the most common age for the association of adeno-carcinoma and fibroids. The diagnosis of the combined conditions was not easy. Very suspicious was the recrudescence of a fibroid after the menopause or the recurrence of hæmorrhage or discharge. A preliminary curetting was usually helpful towards deciding but was not always feasible, as, owing to distortion of the organ, a curette would sometimes not pass in to the fundus. The question arose whether total was not to be preferred to supra-vaginal hysterectomy. The cases also abundantly proved the contention of present-day gynaecologists that once a fibroid was diagnosed the sooner it was entirely removed the better.

The paper gave rise to much interesting discussion.

Dr. William Fordyce gave a communication on "Regurgitation of Blood from the Uterus into the Peritoneal Cavity; with Notes of an Unusual Case."

Dr. J. Lamond Lackie communicated (a) "An Experience of Three Cases of Pubiotomy"; (b) "Note of an Unusual Cause of Pain in the Back."

These communications will appear in the *Journal*.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

NEUROLOGY.

By EDWIN BRAMWELL, M.B., F.R.C.P.,
Assistant Physician to the Royal Infirmary, Edinburgh.

OCCCLUSION OF THE CEREBELLAR ARTERIES.

(a) *Superior Cerebellar Artery*.—Charles K. Mills (*Journ. Nerv. and Ment. Dis.*, February 1912) has just described a new syndrome "which, from the point of view of blood-supply, may be regarded as that of occlusion of the superior cerebellar artery." The main clinical features of this symptom-complex are—ataxia of the upper and lower extremities on one side, and on the other side deafness, paralysis of emotional expression in the face, and loss of the senses of pain, heat and cold over the entire half of the body. On naked-eye examination of the brain of the case upon which the new syndrome is founded a destructive lesion was observed involving the left dentate nucleus and the cerebellum above this nucleus, including also the superior cerebellar peduncle.

(b) *Posterior Inferior Cerebellar Artery*.—It is interesting to compare the very definite symptom-complex which follows occlusion of this

vessel. A number of instances have been recorded in France, Germany, and America. W. S. Spiller (*Journ. Nerv. and Ment. Dis.*, 1908) four years ago was able to collect 16 cases in which there had been a post-mortem examination. S. A. K. Wilson (*Proc. Roy. Soc. Med.*, February 1909) has described the only case reported in this country. Gordinier (*Albany Med. Ann.*, October 1911) has recently reviewed the literature.

The posterior inferior cerebellar arteries arise from the vertebrals on the anterior aspect of the medulla just below the point at which the latter vessels unite to form the basilar. Each artery passes across the inferior cerebellar peduncle (restiform body) to the under surface of the cerebellum, where it divides into two branches, the one passing to the vermiform process, the other to the under surface of the corresponding cerebellar hemisphere. As the artery winds round the restiform body it gives off lateral branches which are distributed to it and to the formatio reticularis. These small vessels are end arteries, whereas the vermiform and hemispherical branches anastomose freely. Hence occlusion of the posterior inferior cerebellar produces softening only in the region supplied by the former. The parts usually involved are the dorsal and ventral spino-cerebellar tracts and other fibres passing into the restiform body, the descending root of the 5th nerve, the nucleus ambiguus, the vago-glosso-pharyngeal nucleus and corresponding nerves, and the fibres of the sympathetic; the 6th and 7th nuclei are rarely implicated, the 8th nerve is sometimes transiently affected, while the 11th and 12th nuclei escape, as do the pyramidal tracts.

The symptoms are summarised by Spiller (*Rev. Neurol. and Psych.*, 1908, 557) as follows:—"The onset is usually sudden and without disturbance of consciousness, the limbs are not paralysed, or at most are paretic on the side opposite the lesion, and the paresis is not persistent. Pain and temperature sensations are diminished or lost in the limbs on the side opposite the lesion, and in the whole or a part of the 5th nerve distribution on the side of the lesion, occasionally also in the face on the side opposite the lesion. Spontaneous pain or paresthesia may be felt in the area of disturbed objective sensation. Tactile sensation and sense of position are usually intact. Ataxia may be present in the limbs on the side of the lesion, with a tendency to fall towards the side of the lesion. Paralysis of the muscles of deglutition, of the soft palate and larynx occurs on the side of the lesion, with smallness of the pupil, retraction of the eyeball, and narrowing of the palpebral fissure (sympathetic paralysis) on the side of the lesion. Hiccoughing and vomiting may be obstinate, and the pulse may be rapid from paralysis of the vagus. The deep reflexes usually are diminished or lost, but may be exaggerated. Headache may be intense. These are the principal symptoms, but there may be others—nystagmus, vertigo, disturbance of micturition, paresis of the tongue, of the 7th nerve distribution and external rectus, and impairment of

taste on the side of the lesion, etc., depending on the extent of the thrombus."

RESULTS OF OPERATION FOR INTRACRANIAL TUMOUR.

A diagnosis of intracranial tumour raises the question of the possibility of removing the growth. Gummata may yield to appropriate remedies, tuberculomata in very rare instances become quiescent, but in all other forms of tumour operation offers the only hope of cure. Recent experience has corroborated previous opinion to the effect that, firstly, successful removal and recovery can only be expected in a very small proportion of cases, and that the radical operation is attended with a high mortality, even in the hands of the first experts of the day; and, secondly, that the symptoms due to increased pressure may be entirely relieved by the operation of decompression, although the palliative procedure is not unattended with risk. It is often possible to localise the growth, it is often possible to predict that the growth is accessible, it is seldom possible to affirm with any degree of certainty that the tumour is removable. The surgeon may find a cyst, or an encapsuled tumour, or a growth so extensive, so vascular, or so infiltrating the brain substance that it cannot be completely removed.

There have been a number of important contributions to the literature of this subject within the past few years. Von Eiselsberg (*Wien. klin. Wochenschr.*, 1912, p. 17) has recently analysed his cases. In studying these results it is instructive to refer to the experience of others.

Von Eiselsberg's cases—100 in all—have been operated on for the most part by himself, in his clinique and private practice. A decompression operation was carried out in 10 cases in which the location of the tumour was uncertain; 6 of these patients left the hospital much relieved, in 2 there was no improvement, while 2 died soon after the operation. The tumour was believed to be in one of the following situations in the remaining 90 cases, and operation undertaken for its removal, viz.:—Cerebrum (43), cerebellum (22), cerebello-pontine angle (12), pituitary (13).

The growth was correctly located in 32 of the 43 cerebral cases. In 9 of these 32 cases death occurred as a result of the operation; 4 of the remaining 23 cannot be traced, while 8 are living from twelve months to five years, and 4 from two weeks to six months, after the operation.

The tumour was found in 11 of the 22 cerebellar cases. In 5 of the 11 the patient died after the first stage of the operation, no attempt having been made to remove the growth; in 1 the tumour was so extensive that it was decided not to attempt to remove it; of the remaining 5, 1 died of shock, and 2 soon after the operation of tuberculous meningitis, while 1 patient from whom a spindle-celled sarcoma

was removed lived for five months. Only 1 patient, in whose case a cyst was evacuated, is now alive and well two years after the operation. 12 cases of tumour of the cerebello-pontine angle were operated upon. In 1 case the tumour was removed at a single operation, the patient dying soon after. In 11 cases a two-stage operation was decided upon: of these 2 patients died after the first stage, 5 died soon after the second operation, while 4 patients are alive at periods of from twelve months to two and a half years later. Two of these patients are quite fit for their ordinary work, 1 is able to do a certain amount of work, while 1 patient feels perfectly well excepting for the loss of vision, which preceded the operation.

These figures illustrate the gravity of operation for the removal of an intracranial tumour and the small percentage of cures. Oppenheim's experience (*Beitr. z. Diagnostik u. Ther. d. Geschwülste im Bereich d. Zentr. Nervensystems*, Berlin, 1907) is interesting in this connection. Up to 1902 he had submitted 24 cases to operation, in only 1 of which a cure was effected. Among 24 cases met with from 1903 to 1907, in which he had advised operation in the hope of removing a growth, 3 cases (11.1 per cent.) were cured; 6 (22.2 per cent.) were improved, a part of the tumour or a cyst in its substance being evacuated; while in 55 per cent. death occurred immediately or soon after the operation. The conclusion arrived at by Oppenheim from his own material was that of every 9 or 10 carefully selected cases, in only 1 is complete removal and recovery to be expected.

Horsley's statistics (*Brit. Med. Journ.*, 25th August 1906) are specially instructive from the point of view of recurrence. Reviewing his experience at the National Hospital during the twenty years preceding 1906 he stated that he had successfully removed a tumour in 55 cases; that among 19 cases of glioma and 4 of sarcoma there had been a recurrence in 20 within two years; that of 8 endotheliomata 1 had recurred three years later and 7 were alive, the longest five years after operation; that of 4 tuberculous tumours, 2 died within three months of tuberculous meningitis, while 2 were alive and well, 1 of these seven years after operation; that among 20 cases which comprised gummata, fibromata, cysts, adenomata and adeno-sarcomata there had been but 1 recurrence.

Henschen (*Ueb. Geschwülste d. hinter. Schädelgrube*, Jena, 1910) in a recent monograph reports 42 cases of tumours of the cerebello-pontine angle submitted to operation which he has collected from the literature. In 8 of these the tumour was removed with subsequent recovery.

The relative frequency of cysts in different situations is a question of importance. Williamson (*Rev. Neurol. and Psych.*, 1910, p. 143) has collected the literature of cerebellar cysts. After allowing for cystic tumours he concludes that at least 1 in 20 of the cases in which the

symptoms are those of cerebellar tumour the actual lesion is a simple cyst. Among 19 cases of cerebellar cyst, excluding parasitic cysts, in which operation was performed, in all the result was recovery at least temporarily.

Fedor Krause in the second volume of his magnificent work (*Chirurgie d. Gehirns u. Rückenmarks*, Berlin, 1911, p. 571) summarises his results in a few paragraphs. He has operated upon 109 cases in all. In 19 of these the tumour was removed at the first operation; 18 of the remaining 90 died after the first operation before the dura mater was opened. The mortality in the cases in which the operation was completed at one stage was $66\frac{2}{3}$ per cent., while in the 72 cases in which the tumour was removed at a second operation it was 20·85 per cent. These figures evidently relate to immediate recovery from operation. Krause gives no statistics in relation to recurrence. In his experience the mortality has been heaviest in the case of tumours in the cerebello-pontine angle, for of 24 cases operated upon only 4 were cured.

Cushing's experience (*Modern Medicine*, ed. Osler, vol. vii. p. 457) is encouraging. He states that "in a series of 63 cases observed during the past ten months, all subjected to operation, there have been 8 operative deaths; marked palliative improvement in 30 cases; no improvement in 10 cases; extirpation of a tumour or evacuation of a cyst with recovery in 15 cases, making 24 per cent. of supposed permanent cures." He further states, "in our series there have been 8 operative deaths, or 11 per cent., and this does not allow for the fact that there have been over 80 operations in these 63 cases, the last and fatal ones often being terminal procedures on patients after a long period of improvement following decompression."

SURGERY.

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VASCULAR ANASTOMOSIS.

RECENT papers on various forms of vascular anastomosis show that the practicability and best technique of the operation are now well established, and increasing experience in clinical work seems to show a decided improvement in results.

Carrel, in a paper on the "Technique and Remote Results of Vascular Anastomosis" (*Surg., Gynecol., and Obstetrics*, March 1912), gives a résumé of his experimental work on the subject. As regards technique, he emphasises the extreme importance of asepsis if the occurrence of thrombosis is to be avoided, believing that slight non-suppurative infection, which does not even prevent the union of tissues

by first intention, may suffice to cause thrombosis. In carrying out an anastomosis, the outer coat of the vessels must be resected from the cut edges for a short distance, for if it gets between the edges or entangled with the suture threads fibrin deposits on it and a clot results. The ends of the vessels must be kept constantly wet with Ringer's solution or smeared with vaseline, and while vessels may be handled by the fingers without damage, forceps must never be used to grasp the middle or inner coats. Perforating stitches are always used, of very fine silk saturated with vaseline and threaded on fine straight needles, described as Kirby No. 16, or for large vessels No. 12. The vessels to be joined should be exposed by a long incision and freely dissected, so as to give ease in manipulation. Three retaining or tension sutures are first inserted at intervals round the circumference of the vessels dealt with, joining them together. By stretching these sutures the cut ends assume a triangular shape, and each side of the triangle is stitched by a continuous suture. Great care must be taken to bring intima to intima, for if a raw surface comes into contact with the blood-stream clotting will surely follow. Anastomosis may be end to end, end to side, or side to side. If the technique is carefully followed, the results, according to Carrel, are practically always positive. Photographs are given showing the appearances of successful anastomoses at periods varying from 8 days to 20 months, and Carrel has a number of animals alive and perfectly well after periods up to four years after various kinds of vascular anastomosis. Stenosis following the operation has never been observed.

Jeger (*Centralbl. f. Chir.*, No. 18, 1912) describes a new clamp which he has devised for carrying out side-to-side anastomosis between blood-vessels without interrupting the blood-stream. The instrument resembles a miniature pattern of the well-known three-bladed clamp for entero-anastomosis, made in such a way as to prevent any slipping of the clamped vessels, and its use is said greatly to facilitate the performance of lateral vascular anastomosis. It has been successfully used in anastomosing the portal vein with the inferior vena cava in dogs, and Jeger's suggestion is that this treatment should be adopted in cases of cirrhosis of the liver, as other methods of relieving the portal circulation are of little or no avail. The clamp is of such a size that a pouch of the portal vein and inferior cava can be drawn into it and fixed for suture without blocking the whole lumen of the veins, while an anastomosis 7 cm. long may be made. Jeger has carried out this operation on 9 dogs. Five of these survived the operation and were eventually killed to test the result. The other four died from causes not associated with the anastomosis, and in no case did leakage or thrombosis occur at the suture line.

To the cases already reported, Bernheim (*Ann. Surg.*, February 1912) adds six operations for arterio-venous anastomosis done by him-

self—one for restoration of the circulation after removal of parts of the popliteal artery and vein for sarcoma with a successful result; two operations on the same patient for advanced Raynaud's disease, also successful; one on a second case of Raynaud's disease, unsuccessful; one for arterio-sclerotic gangrene of the leg, and one in the upper limb, in both of which moderate success was attained. Bernheim has collected in all 52 cases of arterio-venous anastomosis, and after careful analysis finds that fifteen of these were successful in saving limbs from gangrene. Among the failures there were 13 deaths, and in the remaining twenty-two amputation became necessary. End-to-end suture was done 22 times with 8 successes, lateral anastomosis 12 times with 4 successes, invagination of artery into vein 11 times with 3 successes. These results mark a distinct improvement on previous records.

In the same number of the *Annals of Surgery* Boothby and Ehrenfried report 3 cases in an experimental series in which division of the aorta and resuture was carried out in pregnant cats. The circulation was interrupted for 15 minutes during the operation, but perfect recovery took place and pregnancy was uninterrupted.

TUBERCULAR EPIDIDYMITIS—END RESULTS IN SEVENTY-ONE CASES.

Barney (*Bost. Med. and Surg. Journ.*, No. 11, 1912), writing from experience in the Massachusetts General Hospital, gives the results of an examination of cases after operation for tuberculosis of the epididymis. He is not in favour of removing the testis when the epididymis is diseased, believing that the best practice is to excise the epididymis and vas deferens only, unless, of course, the testis is involved in the disease. As the result of careful examination of his clinical material he formulates the following conclusions:—(1) After removal of one or both epididymes the large majority of patients are found to be in good condition and to have gained weight. (2) In two-thirds of the cases there is no demonstrable evidence of tuberculosis elsewhere than in the genito-urinary tract. When present, it is most commonly found in the lungs or bones, but any organ may be attacked. (3) Renal tuberculosis rarely follows an infection of the epididymis. (4) Tubercle bacilli were present in eight out of ten urines as shown by the inoculation test. These urines contained blood and pus, while those giving a negative reaction were normal. (5) A small majority of cases have a normal urine and no urinary disturbances either before or after operation. (6) Post-operative sinuses are found in 25 per cent. of cases. (7) No case on whom epididymectomy was performed is known to have had a recurrence in the corresponding testicle. (8) Tuberculosis of prostate and vesicles is found in more than half, and it is probable that this number would be greater were our methods

of detecting early and centrally located lesions more accurate. (9) In a very large majority the sexual function is undisturbed, but the semen is found to be sterile in 85 per cent. (10) A comparison of many orchidectomies with a few epididymectomies show the latter to have resulted more favourably. It is a fact, however, that infection of the second epididymis is to be expected, with or without operation and whatever operation be done. (11) The mortality of operations for tuberculosis of the epididymis is 5.47 per cent., the cause of death being a general miliary tuberculosis.

NOTE ON THE MESOTHELIOMATA OF THE KIDNEY.

Wilson (*Ann. Surg.*, February 1912), pathologist to the Mayo Clinic in Rochester, has undertaken a study of the so-called hypernephromata of the kidney, which, since Grawitz developed the theory, have generally been considered to be derived from sequestered portions of the adrenal bodies. Although the subject is mainly of interest to pathologists, it is also of importance to the clinician, for, as Wilson points out, a correct description and classification of renal tumours helps to explain certain diagnostic phenomena.

He distinguishes, as the result of his work, four varieties of renal tumour of embryonic origin:—(1) Teratoma, or mixed tumours, commonly found in children. (2) Nephromatous mesotheliomata (so-called hypernephromata), the commonest form of malignant renal tumour in the adult. These arise from masses of nephrogenic tissue which have remained isolated from the renal cortex, and which have, as Wilson and others have recently clearly shown, nothing to do with the adrenal bodies at all. (3) Wolffian “rests,” met with as fairly numerous small masses of yellowish-red tissue in the renal cortex. These are always benign. (4) Adrenal “rests.” These are very much rarer than is usually supposed, and although frequently described, will usually be found to belong to class three. (*Cf.* also on this subject, Glynn, *Quart. Journ. Med.*, January 1912.)

From the clinical point of view, it should be borne in mind that while true carcinoma of the kidney often arises from the site of renal calculi, teratomata and mesotheliomata are rarely preceded by symptoms of other renal lesions. Teratomata develop early, produce no symptoms except abdominal enlargement, and rarely form metastases. Nephrogenic mesotheliomata usually develop late in adult life, and when clinically manifest are usually malignant. Their origin from embryonic epithelium may account for their spread by the blood-stream rather than by way of the lymphatics.

OBSTETRICS AND GYNECOLOGY.

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OCCIPITO-POSTERIOR POSITIONS.

IN an article of no less than a hundred and twenty-seven pages (*Annali di ostetricia e ginecologia*, 1912, ann. xxxiv. pp. 209-336) Dr. Francesco Valtorta, assistant in Milan to Professor Mangiagalli, discusses the subject of occipito-posterior positions of the head in labour. He divides his monograph into eight chapters, under the following headings:—(1) history and statistics; (2) causes; (3) diagnosis; (4) spontaneous labour; (5) artificial labour; (6) prognosis for mother and foetus; (7) clinical and experimental observations; and (8) conclusions and bibliography. It is, of course, impossible to abstract all the matters dealt with, but some of Dr. Valtorta's views and conclusions may be set forth. His clinical material consisted of 3431 labours in which the vertex presented, and in 674 of these the head lay in an occipito-posterior position (viz. 19·72 per cent.); of these 646 were right occipito-posterior positions (18·90 per cent.) and 28 were left ones (0·82 per cent.). Speaking generally, the author gives the frequency of the R.O.P. as 22 per cent., and that of the L.O.P. as 1 per cent. of all vertex labours. It is noteworthy that these figures agree very closely with those of Simpson and Barry, which were 22·68 and 0·58 per cent. for R.O.P. and L.O.P. respectively, whilst they differ markedly from those of Herrgott and Vallois, which were 33·50 and 0·45 per cent. The *etiology* of the occipito-posterior positions is studied at great length, and all possible causes, such as age and parity and occupation of the mother, the measurements of her pelvis, the weight and measurements of the foetus (head, body), and the position of the placenta and amount of the liquor amnii, are discussed. The author attaches considerable weight to the state of the foetus, finding that, as a rule, it is the child with a small degree of flexibility who takes up by preference the posterior position, whose head is in a state bordering upon undoing of flexion ("deflexion"). He finds three classes of foetuses occupying the posterior positions, viz. slightly developed ones, whose heads lie at the upper pelvic strait in any position; slightly developed ones, who, nevertheless, have somewhat enlarged cephalic diameters, making these cases equivalent to slight pelvic contractions; and the moderately or markedly developed ones, with nearly equal cephalic diameters, but with heads enlarged posteriorly and with less projecting occiputs, with rather short bodies, and with a long antero-posterior thoracic diameter. The third group contains the majority; they are those in which the head is inclined to

lose its flexion, and from their anatomical characters it is clear why the presentation does not often change. The head does not show true brachycephaly, for the relation between the biparietal and the occipitofrontal diameters is unaltered. The causes of the occipito-posterior positions are summarised as those which interfere with the accommodation of the head in the anterior positions, which make it indifferent which position it takes up, and which keep it in the posterior variety: they include, therefore, slight development of the foetus, a small head, the hand prolapsed by the side of the head, uterine obliquity, low insertion of the placenta, hydramnios and oligohydramnios, uterine tumours, etc. With regard to *diagnosis*, Dr. Valtorta refers to the ordinary data found on palpation and auscultation, and then goes on to name some less generally known signs. Thus, on external examination, one notes the greater height of the uterine fundus in relation to the estimated development of the foetus, the greater prominence anteriorly due to the forehead lying there, the greater tension of the round ligament on the side opposite to that where the occiput lies, and the palpation of the anterior shoulder; whilst on internal examination there is the longer duration of the stage of dilatation of the cervix, the easy recognition of the quadrangular (anterior) fontanelle, and the greater swelling of the anterior lip of the cervix. With regard to the *mechanism* of labour, it is pointed out that it may occur spontaneously, both when the occiput comes under the symphysis pubis and when it rotates into the hollow of the sacrum. It may rotate to the sacrum if the head is small and the perineum very yielding, or if the head is unflexed ("deflexed") so that the anterior fontanelle lies at a lower level than the posterior. The last named is truly rotation by means of a mechanism, and there were 14 instances of it in the 674 cases seen by Valtorta, that is to say, in 2.07 per cent. The release of the head from the sacrum may occur by one of two mechanisms—(1) by flexion-extension in the case of small foetuses, or rather when the resistance is slight; or (2) by extension-flexion in larger foetuses, or rather when the resistance is marked. It is interesting to compare the time occupied by labour in the anterior positions with that in the posterior positions (with rotation of the occiput under the symphysis): for primiparae it was 15 hrs. 25 mins. in the former and 18 hrs. 55 mins. in the latter, whilst in multiparae it was 9 hrs. 50 mins. and 13 hrs. respectively. The difference was found to be chiefly in the first stage (that of dilatation), the second stage showing only a difference of 20 mins. in primiparae and of 10 mins. in multiparae. For the cases in which labour does not occur spontaneously, postural, manual, and instrumental treatment may be needed. Thus internal rotation may be aided by placing the patient on the side where the anterior fontanelle is lying, thus if the bregma is felt to the right the patient should lie on the right side. Manual intervention is only advised where there is defective rotation of the occiput, and

it consists in trying to increase the flexion of the head by pressing up the forehead. But much time is not to be given to such manoeuvres, and forceps is generally to be used and was used in 54 out of the 674 cases. In 21 cases forceps was applied at the lower strait or perineum, in 33 in the pelvic cavity, and in 2 cases at the upper strait. The *prognosis* is generally quite good both for mother and infant. In Dr. Valtorta's cases even lacerations were rare, an experience not always the lot of the obstetrician.

THE SERUM TREATMENT OF HYPEREMESIS.

Intractable vomiting is still one of the most dangerous complications of the pregnant state, and any suggestion for successful treatment must be received and carefully tested. Into this category falls the suggestion of Drs. Fieux and Dantin (*Ann. de gynéc. et d'obstét.*, 1912, ann. xxxix. p. 162) that we should employ the serum of a normal pregnant woman. These authors were impressed by the fact that Mayer and Linser of Tübingen had rapidly cured a dermatosis of pregnancy by injecting the serum of a normal pregnancy, and they tried the same treatment in a very bad case of vomiting, injecting 12 c.c. of serum obtained from a woman eight and a half months pregnant. The vomiting was not ameliorated, and emptying of the uterus had to be resorted to. This was in 1910, and if it had not been for Le Loriet's more successful attempt in 1911, Drs. Fieux and Dantin would probably not have tried the serum again. As it was, they did make a second attempt, using, however, the serum of a normal woman pregnant two or three months. The patient was a woman 26 years of age, who had had two normal pregnancies and labours, and was now pregnant for the third time, and had reached the third month. She had been vomiting from the very beginning. Various forms of treatment had been tried without success, and she was seriously ill. An injection of a few cubic centimetres of serum from a normal pregnancy of two and a half months was given, and this was followed by temporary amelioration of the vomiting. A few days later 10 c.c. of serum from a healthy woman who had a few hours previously aborted between the second and third month were given. Gradual recovery took place, the vomiting getting less day by day, the pulse improving, the quantity of urine increasing. No other form of treatment was conjoined with the giving of the serum. The authors are very cautious, and do not draw hasty deductions from this case, but if we regard the grave vomiting of pregnancy as a toxæmia, it seems only to be logical to try the effect of such injections.

PLACENTAL ANTIBODIES IN PREGNANCY.

In this relation reference may be made to Professor Paul Bar's article on placental antibodies in the blood of the pregnant patient

(*Arch. mensuelles d'obstét. et de gynec.*, 1912, ann. i. pp. 264-275), in which the proof that the placenta acts on the maternal organism like a foreign albumen is discussed. In a word, are placental antibodies to be found in the blood in pregnancy? Obviously experimentation must be limited to circumstances in which a human placental antigen acts on serum from a pregnant woman, or in which placental antigens from an animal act on serums from pregnant females of the same species of animal. Chirié and Beauvy obtained the antigen from dried and powdered placenta, and took the blood from the cephalic vein of five pregnant women and an eclamptic patient; the results seemed to show that the maternal blood contained no placental antibodies. Fränkl came to the same conclusion. On the other hand, Fieux and Mauriac found that at certain times in pregnancy the blood of the pregnant woman contains a special substance, which, when put in the presence of early villi, causes deviation of the complement. This antibody is shown quite clearly in the course of the second and third months, it becomes markedly less in the fourth month, and is not to be found in the following months of pregnancy. Fieux and Mauriac's researches were abstracted in the periscope of this Journal (*Edin. Med. Journ.*, September 1910), and seemed to show that what may be called the villotoxæmia of the early months of pregnancy leads on to the possibility of the serum-diagnosis of gestation, at any rate in the second and third months. These researches led Bar and Daunay to return to their abandoned experiments. They used antigens both from the placenta and from the foetus. The hæmolytic system was constituted by serum from the rabbit made sensitive for the blood corpuscles of the sheep. With regard to the placental antigens, they were made from placentas of various ages—in eleven instances from normal pregnancies, and in three from pregnancies complicated by auto-intoxication (albuminuria, hyperemesis). In 29 experiments made with the serum of non-pregnant women and the placental antigen the result was negative—no deviation of the complement was observed; the result was also negative with placentas of more than four months and the serum of women pregnant more than five months. There were some positive results when placental antigens of less than four months were brought into relation with the serum of women pregnant less than five months, so that deviation of the complement may be met with under these circumstances, although it is to be regarded as a rare phenomenon, and also, it would appear, feeble and transitory. This sign of pregnancy, however, has a real existence, although it is weak and rare, and must be taken into account in further work on this subject. It is evidently a sign of early pregnancy, for placental antigens of more than four months' age did not give it; further, it depends in some way upon a particular state of the serum. Foetal antigens were also experimented with. In fifteen cases in which the serum of non-pregnant women was

used the result was always negative, but in 21 in which the serum of women pregnant less than three months there were two which gave a positive result. The authors believe, therefore, that foetal albumens may play a part in the process. It is evident that further researches are urgently needed to elucidate this important problem.

TREATMENT OF ABORTION.

Boyen Young and J. T. Williams (*Bost. Med. and Surg. Journ.*, 1912, clxvi. 364) give the results of their experience in two thousand cases of miscarriage, especially in regard to intra-uterine douches, packing, and antiseptics. Some of the cases were infected when they came under treatment, that is to say, they had a temperature of over 100·4 F., not due to any other possible cause of elevation; the other cases were regarded as "clean." The authors' first conclusion is with regard to the danger of post-abortum intra-uterine douches, and they are of opinion, from the fact that the percentage of salpingitis was greater among the douched than the undouched, both in "clean" and in infected cases, that there is an increased risk so introduced into the treatment. Presumably the salpingitis was due to the fluid being forced into the tubes, but one must not forget the possibility of pre-existing tubal infection. The intra-uterine douche seems to have no value as a mechanical agent, for the percentage morbidity in infected cases when sterile water or salt solution was used was twice as great as when the uterine cavity was simply wiped out with sterile gauze. Again, when the various solutions are contrasted, simple sterile salt solution seems to have acted better than formaline ($\frac{1}{2}$ per cent.), corrosive sublimate (1 to 5000), and alcohol (50 per cent.), which were the antiseptics used; at any rate the percentage morbidity was greater with the antiseptic solutions than with the simple sterile water, both in "clean" and in infected cases. In a number of instances swabbing out the uterine cavity with gauze soaked in iodoform (10 per cent.) or in tincture of iodine was used instead of irrigation; and the authors find that swabbing with the tincture gives the best results of all. Intra-uterine packing of the uterus to control the hæmorrhage did not greatly increase the liability to infection, and the best material for packing seemed to be gauze saturated with 50 per cent. alcohol in "clean" cases and plain sterile gauze in infected cases. The last-named fact is very interesting, and makes one ask why the antiseptic should be superior to the plain gauze in "clean" and inferior to it in infected cases. The authors think that "in the former group the introduction of an antiseptic destroys the few bacteria which are often present or introduced during an operative procedure, while in the latter the antiseptic is powerless to cope with the larger numbers of and more widely distributed organisms, and also lessens the draining power of the gauze."

THERAPEUTICS.

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PERISTALTIC HORMONE.

IN 1908 Zuelzer (*Berl. klin. Wochenschr.*, 48, 1908) made the suggestion that normal intestinal peristalsis depends on the presence in the blood of a specific hormone substance. So far as the writer has been able to ascertain, experimental proof has not yet been obtained of Zuelzer's assertion, except by one or two of his collaborators, and it appears that meantime many clinical workers have already submitted the so-called peristaltic hormone to practical test by employing it in the treatment of cases of chronic constipation. Arnaud (*Lyon Méd.*, 1912, No. 1, p. 20), however, has recently drawn attention to the fact that MM. Henriquez and Hallion had stated, at a meeting of the Société de Biologie, 20th February 1904, that the injection of secretin was always followed after a short interval by an evacuation of a liquid discharge from the bowels. Hallion, Laboulais, Brégeon, Millon, and Claisse about this time each reported the successful treatment of cases of chronic constipation by the oral administration of an extract of duodenal mucosa. In all 14 successful results were reported out of a total of 41 cases treated. Various analogies led Zuelzer to suppose that the stomach might be the organ chiefly concerned in the elaboration of a peristaltic hormone, and he succeeded in preparing from its mucous membrane an extract which on intravenous injection into a chloralised rabbit caused, in a few seconds, visible peristalsis in the exposed gut and evacuation of the bowel.

The extract is prepared as follows:—

A recently-fed rabbit is killed and its gastric mucosa treated with salt solution or dilute hydrochloric acid. From the extract obtained the albumen is removed by treating with alcohol. An extract prepared from a stomach during the phase of physiological rest does not contain the active constituent. Active extracts have been obtained not only from the stomach of rabbits but also from that of pigs and horses, and in the case of cattle from the fourth stomach—that which is charged with the work of digestion. Duodenal extracts are weaker and more irregular. Owing to its hormone character, the active constituent should be, and is, found in the blood. The therapeutic extracts are prepared, however, from the spleen, and for two reasons, viz. aseptic preparations and large quantities are more easily obtained. It is still an open question whether the spleen is merely a place of storage or is also an elaborating organ.

Reference has already been made to the effect produced in the

rabbit by intravenous injection, viz. an energetic peristaltic process beginning in the duodenum and passing on to the rectum with the consequent expulsion of its contents. When an intestinal loop of the chloralised injected rabbit is floated in salt water it is observed that the scybalæ are moved down the gut. In some experiments where the peristaltic action was particularly strong an immediate liquid evacuation occurred. From this it has been inferred that an increased transudation occurs, as the entire process only occupies fractions of a minute. The fluid state of the evacuation might, however, equally be explained by the rapid transit of the bowel contents. The action resembles that produced by physostigmine, but the tetanic spasm does not occur. Thus the process seems to conform more to the physiological.

What is the nature of the therapeutic action? Zuelzer suggests that in chronic constipation the normal production of peristaltic hormone fails and that the extract when injected and absorbed not only suffices to produce peristalsis, but may also suffice to incite to a normal production of peristaltic hormone. Alternatively, he suggests that the incitement to peristalsis is conveyed by the nerves, and that the extract exercises a specific irritation on the abdominal ganglia. In chronic constipation there may be autotoxic damage of the nerve apparatus, or the patient may not have reacted for a long time to the normal irritation or stimulus. If, however, an exceedingly strong stimulus be given to the nerve mechanism by the artificial introduction of peristaltic hormone, this mechanism may be restored to a responsiveness to the normal hormone stimulus. Zuelzer considers the latter theory more probable. Other theories found in recent papers cannot be referred to in this résumé.

Clinical Observations by Zuelzer and Saar.—Each of these chose the intramuscular method of injection. Following injection there was little local pain, but both noted a short rise of temperature to 37.5-38° C., which did not affect the heart. Saar (*Mediz. Klinik*, ii. 1910) noted also slight headache, mild fever, a feeling of soreness in the body, increased frequency of the pulse, flatus, and peristaltic unrest—"hormone fever." Zuelzer (*Mediz. Klinik*, ii. 1910) found that the injection was effective on the 2nd or 3rd day but sometimes on the 5th or 7th, thereafter a daily motion occurred for some months. In some cases this regularity was observed for six months. Saar found it more satisfactory to administer castor oil a few hours after the injection, as a *Schiebe-mittel*. Zuelzer experimented on 21 cases. These had suffered from constipation from 1 to 20 years. The sufferers had tried all forms of drugs, electricity, massage, etc. Fifteen on treatment with the extract gave entirely successful results, while six remained as before the injection. The results were good in both spastic and atonic forms of constipation.

Saar had three successful cases and one or two failures.

Zuelzer refers specially to the improvement produced in two cases of intestinal atony of Crämer, which is characterised by intestinal fermentation and frequent unsatisfactory clay-coloured stools. In both cases after injection a single satisfactory daily evacuation occurred, the production of flatus ceased, and the colour of the motions became normal. He concludes that in these cases the hormone has regulated the intestinal innervation. He suggests that the intravenous injection should be of great value in cases of post-operative paralysis of the bowel and even in some cases of ileus. In explanation of the unsatisfactory results in 29 per cent. of Zuelzer's cases he states that all the cases treated by him were of a severe type. He prescribed no dietetic measures except the recommendation to avoid rice, cocoa, and red wine. He adds that the whole subject of constipation requires reconsideration since the discovery of peristaltic hormone. In successful cases methodical exercises of the abdominal muscles and a suitable diet should be resorted to, as doubtless these will be helpful in restraining the tendency to relapse.

Glitsch (*Münch. med. Wochenschr.*, 23, 1911) has reported 2 successful cases and 1 failure; Pfammüller (*ibid.* 43, 1911), 5 successful, 2 unsuccessful (both spasmodic type); Unger, 1 successful; Goldmann, 12 successful; Forkel (*ibid.* 35, 1911), 1 successful; Kauert (*ibid.* 17, 1911), 5 successful, 4 unsuccessful; Kraus, Henle (*Zentr. f. Chir.*, 42, 1910), and many others have likewise reported success in a majority of cases treated; Matchtle, 18 successful, 9 unsuccessful. The most recent statistics of his own cases published by Zuelzer are—treated 52 cases; successful, 31 (duration of "cure," 9 months); of the latter some have remained well for a period of two years.

The writer has treated 8 cases of chronic constipation by the method introduced by Zuelzer. In 3 cases hormone fever occurred with characteristic symptoms, and in a fourth the pulse was increased in frequency from 68 to 92. Three of these have given entirely satisfactory results; in the fourth case there were tense bands of adhesion between the colic omentum and the abdominal wall. In 5 cases there was no constitutional reaction; 2 of these have given a satisfactory result, although in 1 there was a partial but marked organic obstruction. In 7 cases the intramuscular method was used, and in 1 the intravenous method. Of the 5 successful cases 4 were treated in hospital and the fifth was the case of a man who had chronic constipation of twenty years' duration. Six months after the injection he reported there was no recurrence of constipation.

OPHTHALMOLOGY.

By WILLIAM GEORGE SYM, F.R.C.S.,
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THE BACTERIOLOGY OF CONJUNCTIVITIS AND TRACHOMA.

THE peculiar circumstances of the conjunctival sac render it an area in which organisms of many varieties are to be found, whether carried thither by the air, conveyed on dust particles, by direct infection on fingers or towels, or making their way up the nasal duct. As is the case of other mucous surfaces, the conjunctiva has very considerable power of self-protection, and probably resists successfully the attacks of an organism many times for once that it succumbs to the enemy. Evidently a certain amount of tolerance seems to be established, for an organism—as, for example, the pneumococcus—may at one time be a harmless inhabitant of the conjunctiva, and yet at another the cause of severe, it may even be of violent, reaction. What constitutes the difference we cannot say. It may be that at one time the resisting power is greater or less, it may be that the organism is for some unknown reason of lessened or of enhanced vitality, it may be that on one of the occasions of testing an organism is to be found, indistinguishable microscopically from those discovered at an earlier or a later time, yet having been born of a more vigorous and pugnacious strain, of a greater offensive vitality. From a bacteriological point of view as well as from many other points of the scientific compass, trachoma has presented a curious puzzle. Putting other matters aside, the *causa causans* has eluded detection for long, and when one considers the definite pathological identity of the disease, its curious racial distribution, and its contagiousness, and when one remembers the enormous amount of patient laboratory and clinical work and the detective skill expended upon the search for it, one must admit that it is singular that the organism, if there be one, has been amazingly “slim.” So difficult is the problem that we were asked to believe, on the basis of bacteriological work alone, that trachoma was simply a form of chronic gonorrhœal conjunctivitis. The statement presents many difficulties, and no one appeared really satisfied that such is the cause of trachoma. Now, however, the tables are turned, and ophthalmia in infants in some cases, and vaginitis in the mother also, is, we are told on similar grounds, a form of trachoma. The actual basis of this theory, which is, it must be confessed, rather startling, is the fact that cell-inclusions, morphologically indistinguishable from the chlamydozoa described first by Halberstädter and Prowaczek, have been found in the infantile conjunctiva, in the vagina, and in the male urethra in certain cases of urethritis. These bodies are found in some cases along

with, but in others quite independent of, the gonococcus. An interesting point is that the trachoma virus and the virus of "inclusion" blenor-rhoea, whether transferred from the infantile eye or the maternal passage, behave exactly alike when implanted upon the conjunctiva of the ape. It is asserted that a successful attempt has been made to produce trachoma in the adult conjunctiva by implantation of material taken from an infant affected with "inclusion" conjunctivitis, a courageous experiment from any point of view.

Lindner, to whose valuable paper (*Archiv. f. Ophthalm.*, Bd. lxxviii. 2) reference is here made, points out that the infant conjunctiva is more resistant than the adult, as is shown by the very much higher percentage of recovery from gonorrhoea of the conjunctiva in the child than in the adult, and by the comparative mildness of trachoma in the young. He therefore doubts whether such organisms as produce relatively mild conjunctivitis in the adult can have any effect on the infant, and he accordingly regards as unimportant to the question at issue the existence, in a case of "inclusion" conjunctivitis in the infant, of diplobacilli, of the pneumococcus, etc.

He considers that the chlamydozoal conjunctivitis has a slightly longer incubation period than the true gonorrhoeal, has a shreddy rather than a creamy discharge, and affects the cul-de-sac, especially that of the lower lid, to a greater degree; also the cornea is not in so great danger, but scarring of the conjunctiva may result. The inflammation passes off more slowly, there being a period of chronic conjunctivitis succeeding the acute.

Consideration of the social aspect of the matter cannot be neglected. In Egypt he considers the transference of ophthalmia, whether gonorrhoeal or chlamydozoal, is chiefly direct from eye to eye, for with the Egyptians marriage is universal and very early and personal hygiene almost non-existent. Under civilisation, on the other hand, conditions of sexual habits and of hygiene rather tend, according to Lindner, to reduce eye-to-eye infection and increase the genital form of the disease.

The subject is a very complex and difficult one; further light upon it is required, but meantime the suggestions thus delineated merit continued investigation.

ENLARGEMENT OF THE BLIND SPOT.

That there is a blind spot in every normal field of vision is a fact which, in the phrase rendered famous by Macaulay, every schoolboy knows, though of course the fact is one which requires to be pointed out, for no one is conscious of the scotoma; it is purely negative, and the blind portion in one field of vision is "covered" by a seeing portion of the other. To demonstrate this blind spot is perfectly simple by the aid of a blackboard and a sufficiently small test object.

In certain cases of disease of the optic nerve and of its adnexa enlargement of this blind spot is a symptom of considerable importance. Van der Hoeve, who has done a great deal of useful work in this connection, is of opinion that the symptom, if established, points with great probability to disease of the posterior nasal accessory sinuses. His view is that there is a peripapillary nerve-bundle, and that this, which presides over the portion of field immediately surrounding the blind spot, is perhaps more susceptible than some other bundles to involvement in cases of retro-ocular neuritis. But apparently, even apart from definite neuritis and a central scotoma, this portion of the field may be affected and a circumpapillary scotoma be developed. This was described some years ago in connection with sympathetic ophthalmia by Ramsay and Sutherland, in whose cases it seems probable a toxin of some sort was exercising an injurious influence upon the bundle spoken of, this toxin being evolved in the course of the sympathetic inflammation. (It is fair to say that in some such cases this symptom could not be discovered by Holth.) Disease of the nasal sinuses seems to be specially apt to cause this symptom also, which may be an early sign of a genuine retro-ocular neuritis coming on, of which, indeed, it may herald the approach for a long time before any other definite sign. This statement applies to the posterior sinuses of the nose much more than to the anterior, in disease of which the symptom is very much less apt to appear, and when it does it is rather an indication that the orbit has become secondarily involved. In making the diagnosis of enlarged blind spot, Van der Hoeve insists on the necessity of investigating the scotoma by the aid of colours as well as of a white object, and of making quite sure that the colour scotoma is larger than that for white before committing oneself to the diagnosis. Usually the scotoma for blue is slightly larger than that for white, and that for red larger still. He found another interesting fact also, namely, that if the orifices of the accessory sinuses were artificially blocked, the scotoma increased in size and density, while free lavage, on the contrary, did much good. In cases in which lavage did not relieve it was necessary to have recourse to operation to let out the dammed-up pus or discharge. This seems to show that the scotoma is toxic in origin, the source of the toxin being in the discharges.

Köllner has endeavoured to render visible the blind spot, so to speak, his method being to colour differently all the sensations experienced by the left eye and by the right one respectively and simultaneously. The effect of this would naturally be that opposite the blind spot in either eye the colour saturating the other eye will predominate, owing to the absence of visual sensation in that area of the first eye, while in the remainder of the field a fusion of the two colours will result.

ORBITAL SUPPURATION.

As illustrating the highly important relations, though in a somewhat different connection, between the orbit and other parts, Gutman (*Report of Berlin Ophthalmological Society*) describes three cases in which the orbit became involved after the extraction of a tooth. One case was that of a boy of 12, in whom a hard brownish œdema of the orbit with immobility of the globes came on a week after extraction of an upper molar; the temperature at the same time ran up to 104° F. The fundus showed nothing worse than slight engorgement of the veins. Signs pointed to a collection in the frontal sinus, which was opened into and a good deal of pus removed, but the orbit itself was not apparently involved in any way; however, there was no relief to the general symptoms, and the boy died in a few days. Post-mortem, pus was found in both orbits, the cavernous sinus blocked with purulent thrombi, and pachymeningitis, especially over the sphenoid, besides other distant evidences of a general septic infection. His second case was in an older patient, but was not dissimilar in its main features. The cause of death—for this case was fatal also—was thrombosis of the cavernous sinus. In the third case, after the extraction of an upper molar, there was pus formation in the antrum, and vision became seriously affected, the disc exhibiting in the end the white colour and the shrivelled arteries which point to the post-neuritic variety of atrophy. In this case the optic nerve had been affected in a more direct manner than in the other two, but in all a septic process had begun as the result of infection at the gum, either at the time of extraction (by a septic instrument?) or subsequently.

NEW BOOKS.

Tuberculin in the Diagnosis and Treatment of Tuberculosis (Weber-Parkes Prize Essay, 1909, with Additions). By W. CAMAC WILKINSON, B.A.(Syd.), M.D.(Lond.), F.R.C.P. London: James Nisbet & Co., Ltd. 1912. Price 21s. net.

THIS is a reprint ("with additions") of a prize essay on the important subject of tuberculin in the diagnosis and treatment of tuberculosis. The essay is itself a sufficiently interesting study of the subject, unfortunately marred by an aggressively opinionative mode of statement which borders on intemperateness. There is a distasteful personal note running through the volume, which detracts from the pleasure with which one might otherwise have turned over its pages. This is especially evident in the "additions," which include a so-called

apologia, of which the opening sentence reads as follows : — “ Whosoever undertakes to prove that everyone in his own particular society has been wrong, and that he alone has arrived at the possession of truth, takes great risks, and the odds are manifestly against him.” Following this unusual keynote the author proceeds to accuse four well-known members of the profession of having given him a “deliberate stab in the back,” and “conspired to deal this blow at his skill in diagnosis.” This seems hardly the way to maintain and advance scientific truth. Unfortunately the looseness and limitation of conception are not confined to the apologia. Throughout the work we have found evidence of exaggeration of statement and misunderstanding of the views and work of others, which suggests either ignorance or an ill-advised attempt to discredit them. This is a pity, because it is likely to cause a feeling of distrust, not only in relation to the author’s judgment but in relation to the use of tuberculin, about which there was happily coming to be a consensus of opinion among those entitled to pass judgment, that when used with discrimination its value as a diagnostic and therapeutic agent can hardly be appraised too highly.

Studies in Pulmonary Tuberculosis : its Dissemination, Specific Diagnosis and Treatment, and Some Points in its Pathology. By FREDERICK GUY GRIFFITHS, B.A., M.D., Ch.M., Sydney. Pp. 113. London : Baillière, Tindall & Cox. 1911. Price 5s.

COMPOSED largely of extracts from the works of many writers on tuberculosis and, for the rest, of diffuse and disconnected notes on cases treated by tuberculin, this book has very little to commend it to the ordinary medical reader and still less to the reader with special knowledge of the subject with which it deals. In the nature of a panegyric of the virtues of tuberculin in and out of season, and of a eulogy of the teacher (whose name appears on practically every page) whose methods the writer has sedulously imitated, this volume might with advantage have been limited to private circulation. Dr. Griffiths is long behind the times in quoting (date 1904), as a complete scheme for dealing with tuberculosis, a truncated edition of the Edinburgh system which has been before the world for 25 years. It is fortunately rare nowadays to find a man of experience in tuberculosis taking up an attitude antipathetic to compulsory notification of this disease as the author does.

Achondroplasia: Its Nature and its Cause. By Dr. MURK JANSEN, Lecturer on Orthopædic Surgery, University of Leiden, Holland. Pp. 98. With numerous Illustrations. Leiden: E. J. Brill, Ltd. 1912.

IN this very interesting monograph Dr. Murk Jansen expounds a new and rather surprising theory to the effect that achondroplasia is due to amniotic pressure acting on the foetus between the 3rd and 6th week of intra-uterine life. The notable shortening of the limb bones and of the basis cranii he believes to be caused by an abnormally high pressure of amniotic fluid acting generally on the embryo so as to prevent growth, while he attributes the congenital dorso-lumbar kyphosis to the embryo's having been kept in a doubled-up position by an abnormally small and tight amnion about the same time.

If a similar amniotic pressure occurs during the first and second weeks of intra-uterine life Dr. Jansen believes that anencephaly results: if between the 6th and 8th week hemi-ectromelia, oligodactyly, and other defects of the limb bones; and, if after the 8th week, such deformities as club-foot.

He defends his theory with admirable vigour and ingenuity, and arranges his large numbers of apparently conflicting facts so skilfully that his readers can hardly fail to be impressed by them. We do not know whether subsequent investigators will be able to confirm Dr. Jansen's views, but we are sure that they will be benefited by studying his original and stimulating hypotheses.

Professor G. Elliot Smith of Manchester contributes an interesting and appreciative Introduction.

Arthritis: A Study of the Inflammatory Diseases of Joints. By PETER DANIEL, F.R.C.S. London: John Bale, Sons & Danielsson, Ltd. 1912.

THE author deals with inflammatory diseases of the joints, and discusses gout, osteo-arthritis, rheumatoid arthritis, gonorrhœal arthritis, and tuberculous and syphilitic diseases of joints. The last chapter contains a full account of Bier's method of treatment by induced hyperæmia.

All joint affections, be they medical or surgical, are inflammatory in origin, and all arthritis, he thinks, except as a result of trauma, is only a symptom of a disease which has its real nidus in some distant part of the body. This holds good, too, in all cases of tuberculous affections of joints, though the primary tuberculous focus cannot always be localised. Two types of cases exist—(1) in which there is a definite septic lesion of some portion of the body from which toxic absorption may arise; (2) what he calls the aseptic

class, due to a specific bacterium, tubercle bacillus, or pneumococcus. It is not easy to understand what is the real distinction between his types.

Gout he treats of as arising, along with rheumatoid arthritis and osteo-arthritis, from absorption from the gastro-intestinal and genito-urinary tracts.

Though it is not always possible to agree with his attempts to simplify the classification and understanding of joint affections, still the book contains much that is suggestive and valuable both in diagnosis and treatment.

Clinical Symptomatology. By ALOIS PICK and ADOLPH HECHT, Vienna.
London: D. Appleton & Co. 1911.

THIS volume, which deals, not with individual diseases, but with symptoms as they occur in disease, discusses their importance as they are found in various conditions, and how they can be treated.

General symptoms are first dealt with—anomalies of the skin, of temperature, and of nutrition and development. The various systems are then examined, and their disturbances of function described.

The chapters on vomiting, pain, cough, and headache call for special reference. The method here adopted of discussing symptoms generally, and not as they occur in each disease, is always useful and of great assistance to a student in focussing what is known about various symptoms, their relative importance in diagnosis, and relationship to prognosis and treatment. And even though symptomatic therapy is not a good fundamental training for a student, the conditions are many in which, for a time at any rate, this must be adopted—as when symptoms interfere with the comfort or even threaten the life of the patient. This volume forms an excellent guide for such cases.

Nerves and the Nervous. By EDWIN ASH, M.D.(Lond.). Pp. 239.
London: Mills & Boon, Ltd. 1911. Price 5s. net.

THIS book contains many common-sense observations, put in a plain way. The fact that it is intended partly for the use of the “man in the street” would perhaps serve as its author’s excuse for not having made any attempt at giving a real *rationale* of neurasthenia and kindred ailments. Numerous “causes” of nervousness are brought forward, with a corresponding number of therapeutic recommendations, but little stress is laid upon the relative importance of these; the result is that the reader is left in a state of some bewilderment—amid the multiplicity of detail he “cannot see the wood for the trees.”

We believe that the pre-eminence of the *moral* factor in the patho-

genesis of neurotic states is constantly gaining a wider acceptance among modern psychologists: in any case the author would probably have done better to take a definite stand, either in favour of, or in opposition to, this view. If it be granted, then the other "causes" at once become relegated to a subsidiary position. Our own belief is that, without the moral defect, practically no neurosis occurs, and that the various other generally accepted "causes" merely determine the particular form in which that neurosis shall be expressed. It may be that the author himself has not grasped the full significance of this point of view, though here and there a sentence occurs such as the following:—"As a matter of fact, lack of occupation is responsible for many nerve symptoms amongst well-to-do people, who have no definite object in life" (page 48). And yet, almost in the next breath, he states that neurasthenia is "a disorder that is usually secondary to abnormal conditions in the various organs of the body" (page 131), or, in reference to phobias, "One is unable to give any explanation that will cover them all, except that loss of nerve-energy or loss of tone in certain nerve-cells has led to the partial loss of control of the mind in certain directions, so that from the point of view of particular conditions the patient is not actually under self-control" (page 28). Nevertheless, apart from the absence of a reasoned survey of the whole field of neurasthenia (such as we meet with, for example, in the works of Dubois), there occur incidentally in this book, as already said, many passages and hints of considerable practical value. The author, for instance, is to be congratulated on insisting that it is not only brain workers who suffer from nerves; that "it is worry, not work, that wears people out;" that drugs are, at best, mere palliatives in these conditions (*e.g.* "To sleep with the aid of drugs is merely to avoid the main issue"); that long "trips abroad," with their attendant bother and expense, "frequently do far more harm than good;" that treatment should be carried out as far as possible at home, "with the least interruption of daily life and work;" that "under no circumstances must a direct voluntary effort to go to sleep be made by anyone who has a tendency to nervous insomnia;" that modern methods of education tend, as often as not, to repress rather than to foster development.

In subsequent editions the author would do well to show that he is clear in his own mind as to the distinction between "nerve energy" considered as a force allied to electricity (page 97), and that other "force or agent" which, as he says (page 125), "is capable of energising our physical bodies and remedying our ailments to an extent that is but seldom realised," which "is inevitably bound up with that principle which one may variously call EGO, SOUL, SPIRIT, or SUB-CONSCIOUS SELF, and of which one begins to doubt if there are any limits to its possibilities."

A System of Surgery. Edited by C. C. CHOYCE, F.R.C.S. ; Pathological Editor, J. MARTIN BEATTIE, M.D. In three volumes. Vol. I. Pp. 957, with 16 Coloured Plates, 64 Black and White Plates, and 250 Illustrations in Text. London: Cassell & Co., Ltd. Price 21s. net.

WITHIN recent years we have had occasion to notice the appearance of several exhaustive systems of surgery by American authors, but it is a considerable time since a complete system was issued in this country. The time was ripe for such a work, and Messrs. Cassell have provided it. Mr. C. C. Choyce as editor has enlisted the aid of some fifty British surgeons, and it is proposed to present in three volumes an authoritative work representative of British surgery. The list of contributors includes a preponderating number of London surgeons, but other English centres are represented, and the names of two Scottish surgeons appear on the list. The duties of pathological editor have been assigned to Professor J. Martin Beattie of Sheffield.

The first volume is now before us, and, so far as can be judged from it, the editors have succeeded in the difficult task of providing a full and consistent account of the principles of surgery free from overlapping and repetition.

In accordance with modern ideas the work opens with a consideration of surgical bacteriology by Georges Dreyer and E. W. Ainley Walker, the essentials of the subject being fully yet succinctly presented. A useful practical chapter on serum and vaccine therapy by J. W. H. Eyre follows. Inflammation, repair, the examination of the blood and cerebro-spinal fluid, and tuberculosis are dealt with by Professor Beattie, whose name to Scottish readers is sufficient warrant for the quality of the work. The section on tumours, by Raymond Johnson and T. W. P. Lawrence, which extends to nearly 260 pages, is one of the most complete and satisfactory expositions of a difficult subject with which we are acquainted. Colonel Lambkin, than whom there is no more convincing writer on syphilis, deals with the acquired form of the disease, and J. E. R. McDonagh with congenital syphilis. As indicating the importance attached meanwhile to the treatment by salvarsan, a special chapter is devoted to this subject. It is written by Majors Gibbard and Harrison, and is evidently the result of experience. The editor, with Gwynne Williams, deals with wounds and wound treatment.

The work is copiously illustrated and the illustrations are admirable. Our only criticism is that the reproductions of radiograms in the section on X-ray examination are on too small a scale—so small indeed as in many cases to necessitate the use of arrows to indicate the lesions they are intended to represent.

We can confidently recommend this work to practitioners and

advanced students of surgery as one which does not merely rely on the merits of its illustrations, excellent as these are, but which contains in readable form a sound and complete presentment of modern British surgery.

Operative Obstetrics. By EDWARD P. DAVIS, A.M., M.D. Pp. 483.
With 264 Illustrations. Philadelphia and London: W. B. Saunders Co. 1911.

THE recent development of obstetric surgery brings with it additional treatises, and Professor Davis contributes the volume now before us. The pregnant woman is surveyed from the surgical standpoint, experience showing that pregnancy is not, as was formerly considered, a barrier to operative interference, as instanced in a case in which an enlarged dislocated spleen was successfully removed without disturbing gestation. The technique of obstetric surgery is fully gone into, and the various methods of obstetric anaesthesia are reviewed. The first and second parts are devoted to the surgery of pregnancy and labour, the third and fourth parts to the surgery of the puerperal period and the newborn. The author is an advocate of forceps, with tapes passed through apertures in the cephalic portion of the blades at their middle by which traction may be carried out, the movements of the head being controlled with the handles of the forceps grasped in the other hand. This method has obvious disadvantages, which are more than overcome by the axis-traction instrument. The old operation of version, which is too apt to be lost sight of in the more recent operative procedures, is well described by the writer, who reminds us that this operation can be performed in emergencies by a physician without skilled assistants.

Embryotomy is relegated to a few pages, clearly and rightly indicating the true value of the living child at birth.

Vaginal Cæsarean section is detailed at greater length than the benefits to be derived from the operation would seem to justify. In the event of threatened death of the mother from heart disease or actual sudden death, the foetus being alive, most operators would prefer the abdominal to the vaginal route.

While too advanced for the busy general practitioner, the volume is a carefully-thought-out contribution to the subject of obstetrics, and in addition to being profusely illustrated throughout, each subject is supplemented with a valuable bibliography.

Transactions of the American Gynecological Society. Volume XXXVI., for the year 1911. Pp. lxii. 606. Philadelphia: Wm. J. Dornan. 1911.

THE annual volume of the American Gynecological Society's *Transactions* is always a welcome addition to the library of the specialist.

The present volume is rather more obstetrical than gynecological, a fact which is due largely to the prominent place occupied by the papers and discussions on placenta prævia and eclampsia.

There are no fewer than six articles on placenta prævia by such obstetric masters as Davis, Cragin, Clifton Edgar, Fry, Tucker Harrison, and Newell. In these articles and in the discussion to which they gave rise one conclusion definitely emerged, viz. that the domestic and hospital treatment of placenta prævia must necessarily be very different, and we are glad to see that a strong plea was made for the bringing of placenta prævia patients into hospital for management. The plan of using dilating bags still occupies a somewhat uncertain place, and the choice between the intra-ovular and extra-ovular use of such dilators can hardly be regarded as clear yet or easy. The address by the President (Dr. Reuben Peterson) on Vaginal Cæsarean Section in Eclampsia is a valuable monograph on the subject with which it deals, but the conclusion which is reached, viz. that the sooner the uterus is emptied after the first convulsion in ante-partum eclampsia the better, is not likely to receive universal approbation. With the necessity for early diagnosis we cordially agree, but with that for early operation in eclampsia we cannot; early diagnosis ought to mean early employment of such medical means as stomach-washing, venesection, transfusion of saline and purgation, the continuance of the pregnancy to the full term, and a normal delivery.

Dr. Ehrenfest sums up against the value of renal decapsulation in eclampsia, a conclusion with which most obstetricians will agree. There are many other interesting articles in this portly volume of over 600 pages, and amongst these we may name Whitridge Williams' on the Funnel Pelvis, Gellhorn's on Salpingostomy and Pregnancy, Manton's on Double Dermoids and Pregnancy, and Bissell's on the "Pelvic" Kidney. A valuable contribution to scientific gynecology is Mr. John A. Sampson's experimental study of the blood-supply of uterine myomata; from this it emerges that the vascularity of these tumours is frequently greater in its arterial supply and always less in its venous than that of the myometrium in which they are embedded.

Abhandlungen aus dem Gebiete der Geburtshilfe und Gynäkologie.

Herausgegeben von Professor Dr. W. TAUFFER. Band II. Heft 1. Berlin: Verlag von S. Karger. 1912. S. 200. [Contributions from the Obstetrical and Gynecological Department. Edited by Professor W. TAUFFER, M.D. Vol. II. Part 1. Berlin: Published by S. Karger. Pp. 200. 1912.]

THE memoirs contained in this volume are founded upon the clinical material available in the Second Gynecological Clinic of the Buda-Pesth University. They are six in number, two coming from the pen of

Dr. Josef Frigyesi, two from that of Dr. Otto Mansfeld, and two from that of Dr. E. Scipiades. The subjects dealt with are as follows:—The treatment of placenta prævia, with special reference to version and the plugging of the cervix with a fetal leg; pyelitis in pregnancy; the preparation of the abdominal wall for laparotomy in gynecological cases; the use of Momburg's constricting abdominal belt in hæmorrhage cases; inversion of the uterus in association with hypoplasia of the adrenal gland system; and the first of a series of studies on the relationship between fibroid tumours of the uterus and pregnancy. It is an interesting and valuable contribution to the subjects of midwifery and gynecology.

Fourth Report of the Wellcome Tropical Research Laboratories at Khartoum.
Volume A (Medical) by ANDREW BALFOUR, M.D., Director.
Pp. 404. With 174 Illustrations. London: Published for the Sudan Government by Baillière, Tindall & Cox. 1911. Price 21s. net.

IT is three years since the last report was published; in the meantime so much matter has accumulated that it has been found necessary to issue the fourth report in two parts—A (Medical), B (General Science). The former is at present under notice.

The papers cover a wide range, and include articles on "Sleeping Sickness in the Anglo-Egyptian Sudan," "Trypanosomiasis and other Diseases of Animals," "Kala-Azar," "A Preliminary Note on Fevers in the Sudan," "Fallacies and Puzzles in Blood Examination," and many other interesting subjects. One cannot help feeling envious of Balfour and his colleagues in their possession of so much material for research work.

It is evident that in the Sudan as in India the question of the diagnosis of fevers is a troublesome one. The director realises that it is advisable to treat the subject with caution, for he states in the introduction that "the notes on fevers in the Sudan are inserted more for the purpose of drawing attention to the little we know about them than giving any full description of them, which, indeed, with our present knowledge, is impossible."

Kala-azar is now such a widely spread disease that the article by Bousfield on "Kala-Azar in the Kassala and Blue Nile Districts of the Sudan," giving the results of his investigations during a tour extending over four months, is most instructive. His experiences of splenic puncture, with details of the methods employed, are well worth careful study. The same may be said of the general and pathological reports of the commission appointed to investigate the prevalence and cause of the disease in the Eastern Sudan. The report by the director and Archibald of a case of kala-azar treated by "606" is inconclusive.

The article by Buchanan on the "Developmental Forms of Trypanosomes" proves him to be a careful observer. The appended coloured plate and others in the book show he is a capable artist.

The article by Balfour on "Fallacies and Puzzles in Blood Examination" is well illustrated by drawings and coloured plates. It should prove of value to all whose work includes examination of the blood.

"The unknown and peculiar bodies" (1 and 2, Plate VI.) are not peculiar to the Sudan; reference to the second report (p. 196) and to the issue of this *Journal* of January 1907 will show that they have been found in the blood of a cornerake and of a water-hen in the vicinity of Edinburgh. Laveran, who kindly examined slides sent to him, wrote—"The structures are of a vegetable nature, accidentally introduced, and resemble very closely the spores of fusarium, a fungus common in granaries."

It is interesting to notice that the spermatozoa of a bird accidentally included in a blood film were in a case occurring in Australia mistaken for spirochaetes. A slide of this nature was shown at the meeting of the Pathological Society in Edinburgh in June 1907, the structures which at first presented difficulty of recognition having been recognised as spermatozoa of the starling.

In a short review it is impossible to take notice of all the papers. It is sufficient to say that sanitary and medical officers, whether working in the tropics or elsewhere, will find the various articles both interesting and instructive, while the veterinary notes and the results of investigations into the diseases of animals will no doubt be appreciated by members of the veterinary profession.

Second Review of Some of the Recent Advances in Tropical Medicine, Hygiene, and Tropical Veterinary Science, being a Supplement to the Fourth Report of the Wellcome Tropical Research Laboratories at the Gordon Memorial College, Khartoum. By ANDREW BALFOUR, M.D., B.Sc., F.R.C.P. (Edin.), Director, and Captain R. G. ARCHIBALD, M.B., etc. Pp. 448. London: Baillière, Tindall & Cox. 1911. Price 15s. net.

THIS large handsome volume will doubtless be welcome (we are not trying to be facetious) to all workers in tropical medicine and the allied sciences, for it gives an admirable survey of recent advances in the long list of maladies which are now included under this heading. It is a long list too, running alphabetically from anaplasmosis and ankylostomiasis through filariasis, Leishmaniasis, mycetoma, paratyphoid fever, schistosomiasis, spirochaetosis to verruga, yaws, and yellow fever. No medical library can afford to be without this work.

Records of the School of Medicine, Cairo. Edited by the DIRECTOR. Volume IV. Pp. 613. With numerous Illustrations. Cairo: National Printing Department. 1911.

THE whole of this huge book is occupied by the second part of Looss' monograph on the "Anatomy and Life-History of *Anchylostoma Duodenale*" (*dub.*), e.g. "The Development in the Free State of the Worm." It is divided into two parts—(I.) "Remarks on the Comparative Anatomy, Classification, and Development of the Nematodes;" and (II.) "The Development of the *Anchylostoma Duodenale* in Particular."

It may be stated at the outset that while the work will appeal to the advanced helminthologist and biologist for purposes of reference, it is too elaborate for the ordinary medical man, unless he is specially engaged in the treatment or prevention of ankylostomiasis.

The various parts of the subject are treated with the author's well-known attention to detail. The illustrations comprise 8 full-page plates, with over 100 figures.

The general weighty nature of the letterpress is relieved by some very frank criticisms of the writers of text-books and others. For example, in reference to one writer it is stated "the work in the end sinks as it were like water into sand, simply because the author lacked the firm foundation of correct information." Looss' own idea of the value of his work, and the present volume in particular, may be gleaned from the remark—"My present work is no text-book, but I will try in it to make the authors of future text-books so far acquainted with the actual natural history of the ankylostoma that they may offer their readers correct and precise statements."

The Climate of the Continent of Africa. By ALEXANDER KNOX, B.A., F.R.G.S. Pp. 552. With numerous Maps. Cambridge: University Press. 1911.

THE opening out of Africa is proceeding at such a rapid pace, and so many people engaged in industrial or missionary enterprise are yearly leaving this country to engage in work in Africa, that it is essential we at home should have some knowledge of the climate and general conditions of the different regions in some detail. This book, containing a vast store of information, gleaned from many sources with infinite trouble, will supply a long-felt want.

The general impression given is that the climate of Africa is good, although in certain areas not suitable for European colonisation.

People at home are apt to think that the climate of places in the tropics may be judged by estimating the latitude and longitude. This is most erroneous, for in India and also in Africa the climate may,

within the range of a few miles, vary from an absolutely deadly to a most healthy one. From the exact details given in this book persons intending to proceed to Africa may gain much valuable information.

In a work which has entailed references to so many varied authorities, and when as a matter of course the author could not be personally acquainted with all the different regions, errors were sure to creep in, but so far as we can see they are comparatively few.

On page 370 the statement—"It is said that European women stand the climate of Nyassaland better than men" is hardly in accord with the experience of others. Again, on page 374 it is stated that "the Shire Highlands are eminently suited for the growth of coffee and for the rearing of cattle and horses." Our information, obtained from a most reliable source, is to the effect that the majority of the planters have abandoned the growing of coffee and commenced tobacco cultivation, and horses do not live in the Highlands.

We commend the book to all interested in Africa, and especially to those who purpose proceeding there.

NEW EDITIONS.

A Text-Book of the Practice of Medicine. By JAMES M. ANDERS, M.D.
Tenth Edition. Pp. 1328. Philadelphia and London: W. B. Saunders Co. 1911.

WE have read this substantial volume with great pleasure. It is a very useful compendium of medicine. Not only does it give a satisfactory account of the more important diseases in the beaten track, but nearly all the bypaths are also traversed, and where the description of a rare condition is necessarily short there is at least a reference to indicate where more information may be had. A good deal of what is usually left to works on clinical methods is here included in a short practical way.

Some of the author's suggestions for treatment are somewhat unorthodox, but they are evidently based on a large experience, and a practitioner nearing the end of his resources in the treatment of a difficult case might do worse than consult this book.

An Index of Treatment. Edited by ROBERT HUTCHISON, M.D., and H. STANSFIELD COLLIER, F.R.C.S. Sixth Edition. Pp. xvi., 1039. Bristol: John Wright & Sons, Ltd. 1911. Price 21s.

ON its first appearance in 1907 the *Index* at once took its place as a most concise and practical manual, and that it has continuously

appealed to a wide circle of readers is shown by the rapid sequence of new editions—six in the space of four years. The present edition has been thoroughly revised, and now includes articles on photo-, hydro-, and thermo-therapy, and puerperal sepsis. A book which has enjoyed so favourable a reception stands in little need of a reviewer's praise, and it is enough to say that the sixth edition has all the good qualities of the old, with a few new ones of its own added.

The Diagnosis of Nervous Diseases. By PURVES STEWART, M.A., M.D., F.R.C.P. Third Edition, revised and enlarged. Pp. 477. London: Edward Arnold. 1911.

THE very favourable criticism given to the first edition of this work on nervous diseases can be readily repeated. In the short period of three years the third edition has appeared. The book has been translated into French and German and largely used abroad. Various improvements have been introduced, bringing it thoroughly up to date, and the already large number of excellent and needful illustrations has been considerably increased.

Dr. Purves Stewart's method of dealing with the diagnosis of nervous diseases simplifies an otherwise difficult branch of medicine. His manner of describing, discussing, and illustrating symptoms as they are actually seen in the routine examination of patients has much to recommend it. The book is clearly written, and as an introduction or a companion to larger neurological text-books will be of immense service to the student and practitioner.

Nervous and Mental Diseases. By ARCHIBALD CHURCH, M.D., Professor of Nervous and Mental Diseases and Medical Jurisprudence in the North-Western University Medical School, Chicago, and FREDERICK PETERSON, M.D., Professor of Psychiatry, Columbia University. Seventh Edition. Pp. 932. Philadelphia and London: W. B. Saunders Co. 1911.

PREVIOUS editions of this well-known text-book have been noticed in the pages of the *Journal*. The book may be said to consist of two monographs, the one on neurology by Dr. Church, the other on psychiatry by Dr. Peterson. The present edition has been thoroughly revised. The chapters on meningitis, aphasia, poliomyelitis, pellagra, and pituitary diseases have been largely rewritten. The various recent theories regarding hysteria have been briefly sketched, while the section on mental diseases has been wholly rearranged in accordance with the present trend of classification in America. The type is clear,

the illustrations for the most part excellent, and the index thoroughly satisfactory. The work can be confidently recommended to students and practitioners as a good up-to-date text-book on nervous and mental disease of moderate bulk.

Clinical Diagnosis: A Text-Book of Clinical Microscopy and Clinical Chemistry, etc. By CHARLES PHILIPS EMERSON, A.B., M.D. Third Edition. Pp. 724. Philadelphia and London: J. B. Lippincott Co. Price 21s. net.

DR. EMERSON'S book has in five years reached its third edition, and with each revision has strengthened its claim to the position of a classic among works of its kind. Its main title of *Clinical Diagnosis* is rather too comprehensive, for it does not include the methods of bedside examination such as percussion and auscultation, but deals with those auxiliary investigations—microscopic, chemical, and biological—which have so prodigiously multiplied in the last few years, and which now more and more tend to be left in the hands of special experts. In this field the book has won a place of high authority. It is specially complete on the chemical and microscopical side, for here the author's own extensive and diligent investigations are supplemented by most abundant references to current literature. Nothing could be fuller and more thorough than the chapters on the urine and the blood, and even such minutiae as the making of blood-smears are described, though one notices no account of the Cammidge reaction in the one, and a rather imperfect description of the Romanowski stain and its modifications in the other.

The bacteriological portions of the book are much less complete, and are more in the nature of abstracts; they might well be cut out without any material loss. The volume is enriched with a number of fine colour plates and original drawings. The few photo-micrographs of bacteria are, however, rather poor.

Pathological Technique. By FRANK BURR MALLORY, A.M., M.D., Associate Professor of Pathology, and JAMES HOMER WRIGHT, A.M., M.D., Assistant Professor of Pathology, Harvard Medical School. Fifth Edition. Pp. 507. 162 Illustrations. Price 13s. net.

THIS well-known guide to the student and pathologist has reached its 5th edition. This, along with the fact that it is written by two such authorities as Professors Mallory and Wright, is sufficient indication of its value. One turns to it not merely to remind oneself of steps

in technique and in well-known methods, but in order to obtain new information and fresh methods, introduced by the authors themselves.

The science of pathology advances slowly but surely by the patient work of careful observers, but every now and then a more definite step forward is taken through the throwing open of new fields by pioneers. The means by which the door is opened has been, in very many instances, the discovery of a new staining method—witness Weigert's discovery of specific elastic tissue, myelin, and neuroglia staining methods.

In a very real sense the authors of this book are carrying on Weigert's work. To them we owe numerous useful staining methods, more especially for connective tissue and blood.

In the bacteriological portion of the book also there is much that is new and original, as, for example, Wright's work in connection with *Streptothrix actinomyces*.

As regards the portion of the book dealing with the post-mortem examination, the only point which we feel inclined to criticise is the removal of the whole intestinal tract before the liver, and the severance in this way of the connections between the two.

The chapters of the book dealing with the theory of fixation and staining are particularly good, and have been revised in the present edition. The illustrations are excellent and largely original. In short, the book is one which we have no hesitation in strongly recommending to students and specialists alike.

A Text-Book of Pathology. By FRANCIS DELAFIELD, M.D., LL.D., and T. MITCHELL PRUDDEN, M.D., LL.D., New York. Ninth Edition. Pp. 1114. With 13 Plates and 687 Illustrations. London: Baillière, Tindall & Cox. 1912. Price 25s. net.

WE need not do more than chronicle the appearance of the ninth edition of this well-known work on pathology. At the hands of Dr. Prudden—Dr. Delafield no longer sharing in the preparation of the work—the revision has been thorough, amounting in some sections to complete rewriting, and many new illustrations have been added. The place of this text-book in the literature of pathology is already established, and its reputation can only be enhanced by the present issue.

NOTES ON BOOKS.

Materia Medica and Therapeutics for Nurses, by John Foote, M.D. (J. B. Lippincott Company, price 4s. 6d.). How much materia medica and therapeutics a nurse should know is a difficult question to answer. At present the education of the nurse is being carried on at a higher level than in former years, and she is being taught much that is apparently unnecessary. Much that is apparently unnecessary will be found in *Materia Medica and Therapeutics for Nurses*. Yet if we confine our teaching to the wholly necessary it is often vastly dull, and if an appreciation of the action of medicinal substances can rouse the nurse to interest in her daily duty, surely something has been accomplished which will repay the labour. A large number of medicinal substances are considered by the author and much useful and at times very practical knowledge is included. At the end of each section there is incorporated a set of questions for the student to answer. Nearly seventy pages of the volume are occupied by a reference list of commonly used drugs, chemicals, and proprietary medicines.

The second edition of *A Dictionary of Medical Diagnosis*, by H. L. McKisack, M.D., M.R.C.P. (Baillière, Tindall & Cox, price 10s. 6d.), has been brought up to date by revision of some of the articles and by the addition of several new ones. The Wassermann reaction, the use of antiformin in sputum examination, and von Pirquet's cutaneous tuberculin reaction are examples of recent methods now described. The significance and the relative value of the symptoms and signs discussed are well brought out, and the longer articles, such as that dealing with the physical examination of the thoracic viscera, contain much of value clearly and briefly put.

The photographs and diagrams illustrating the text add to the usefulness of the book, which can be recommended to the notice of both practitioners and students.

We have received Volume III., twenty-first series, of *International Clinics*, which contains a number of practical and interesting articles on Medicine, Surgery, Obstetrics, and the various special branches. The two articles on Obstetrics are by Scottish pens—Dr. J. W. Ballantyne contributes a paper on "Morbid Pregnancies under Hospital Treatment," in which he urges, with great earnestness and authority, the importance of prematernity treatment in various conditions; while Professor Jardine of Glasgow writes on "The Retraction Ring as a Cause of Obstruction in Labour." The range of interest which these

and other articles cover, and their practical value, make this volume, like its predecessors, a desirable addition to the bookshelf of the practitioner.

Among special lexicons, Dr. W. A. Newman Dorland's *Illustrated Medical Dictionary* (sixth edition, London, W. B. Saunders Company, 1911, 19s. net) takes a high place. It is very compendious. The definitions are concise, and are helped out by numerous plates, and there are a number of useful tables, *e.g.* stains and staining methods. The printing and binding facilitate consultation of its pages, and in every respect it forms an admirable work of reference.

We have received the new edition (4th) of Margaret D. Palmer's *Lessons on Massage* (Baillière, Tindall & Cox, price 7s. 6d. net). It has been thoroughly revised, more attention has been paid to the massage in the treatment of fractures, and the illustrations have been greatly improved. The work can be recommended with confidence to students of massage.

Dr. Frederick F. Middleweek has provided a useful guide to *Medical Gymnastics and Massage* (John Bale, Sons & Danielsson, price 2s. 6d. net). It is specially addressed to practitioners who are not within reach of a medical gymnasium, and by them it will be found reliable and practical.

In the 1912 edition of *Nisbet's Medical Directory* (James Nisbet & Co., Ltd., price 8s. 6d. net) the names of medical practitioners are given in full, which is a distinct improvement. In other respects the arrangements are the same as in previous issues. We find this directory a most useful accessory to our writing desk.

BOOKS RECEIVED.

- ANNUAL Report of the Sanitary Commissioner with the Government of India for 1910 4s. 6d.
 BERRY, J., and T. PERCY LEGG. Hare-lip and Cleft Palate (J. & A. Churchill) 12s. 6d.
 BLUMFELD, J. Anæsthetics. Third Edition (Baillière, Tindall & Cox) 3s. 6d.
 CHEYNE, W. W., and F. F. BURGHARD. Manual of Surgical Treatment. Vol. II., new edition. (Lea, Williams, Green & Co.) 21s.
 CIPSON, JULIUS. Translated by A. L. Garbat. Immunity (P. Blakiston's Son & Co.) 3dols.
 CRAIG, MAURICE. Psychological Medicine. Second Edition (J. & A. Churchill) 12s. 6d.
 DELL, J. A. The Gateways of Knowledge. (Cambridge University Press) 2s. 6d.
 GOEPP, R. M. Dental State Board Questions and Answers (W. B. Saunders) 12s. 6d.
 GREENE, R. H., and HARLOW BROOKS. Diseases of the Genito-Urinary Organs and the Kidney. Third Edition (W. B. Saunders) 21s.
 GRUNBAUM, A. S. The Essentials of Morbid Histology (Longmans, Green & Co.) 7s. 6d.
 GUELPA, G. Translated by F. S. Arnold. Fasting in Diabetes (Rebman) 5s.
 HARRIS, A. Pulmonary Phthisis (J. W. Wright & Sons) 2s. 6d.
 HILGER, W. Hypnosis and Suggestion (Rebman, London) 10s. 6d.
 HIRSCHBERG, J. Translated by G. L. Johnson. Treatment of Short Sight (Rebman, London) 5s.
 JACK, W. R. Wheeler's Handbook of Medicine. Fourth Edition. (E. & S. Livingstone) 8s.
 JAMIESON, W. A. Care of the Skin in Health (F. & J. H. Baillière, London) 2s. 6d.

- KELLY, H. A. A Cyclopaedia of American Medical Biography. Vols. I. and II. (W. B. Saunders) 42s.
- LICKLEY, J. D. The Nervous System (Longmans, Green & Co.) 6s.
- LUCAS, R. C. The Bradshaw Lecture, 1911. Some Points on Heredity. (Adlard & Son) 2s.
- MCDONAGH, J. E. R. Salvarsan in Syphilis (Frowde, Hodder & Stoughton) 7s. 6d.
- McKAIL, D. Public Health Chemistry and Bacteriology (J. W. Wright & Sons) 6s. 6d.
- McKISACK, H. L. Systematic Case-Taking (Baillière, Tindall & Cox) 3s. 6d.
- MAYOU, M. S. Diseases of the Eye. Second Edition (Frowde, Hodder & Stoughton) 7s.
- MOLL, ALBERT. The Sexual Life of the Child (Geo. Allen & Co., Ltd.) 15s. net.
- PAGET, S. For and Against Experiments on Animals (H. K. Lewis) 3s. 6d.
- POTTS, C. S. Electricity, Medical and Surgical (Churchill) 18s.
- PROCEEDINGS of the Royal Society of Medicine. Vol. V., No. 6 (Longmans, Green & Co.) 7s. 6d.
- QUAIN'S Elements of Anatomy. Eleventh Edition. Vol. II. Part I. (Longmans, Green & Co.) 25s.
- RAWLING, L. B. Landmarks and Surface Markings of the Human Body. Fifth Edition. (H. K. Lewis) 7s.
- ROBIN, A. Thérapeutique Usuelle du Practicien—Traitement de la Tuberculose (Figeot Freres, Paris) 8 frs.
- SANDERS, GEORGIANA J. Modern Methods in Nursing (W. B. Saunders) 12s.
- SCUDDER, C. L. Tumours of the Jaw (W. B. Saunders) 25s.
- SHENNAN, T. Post-Mortems and Morbid Anatomy (Constable & Co.) 18s.
- SIXTH Annual Report of the Henry Phipps Institute for the Study, Treatment, and Prevention of Tuberculosis (Philadelphia) —
- STILL, G. F. Common Disorders and Diseases of Childhood. Second Edition. (Frowde, Hodder & Stoughton) 16s.
- THOMSON, ALEXIS, and ALEX. MILES. Manual of Surgery. Vol. II. Fourth Edition. (Frowde, Hodder & Stoughton) 10s. 6d.
- TIBBLES, W. Foods—their Origin, Composition, and Manufacture (Baillière, Tindall & Cox) 18s.
- TRANSACTIONS of the College of Physicians of Philadelphia. Third Series. Vol. XXXIII. —
- TURNER, A. LOGAN, and W. G. PORTER. The Skiagraphy of the Accessory Nasal Sinuses. (Wm. Green & Sons) 10s. 6d.
- WHITEFORD, C. H. An Operating Theatre in Private Practice (Harrison & Sons) —
- WHITLA, WM. Dictionary of Treatment. Fifth Edition (Baillière, Tindall & Cox) 16s.
- WOODCOCK, H. DE C. The Doctor and the People (Methuen, London) 6s.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—The following gentlemen, having passed the requisite examinations, have been admitted Fellows:—George Blair, M.B., Ch.B.(Edin.), Markinch, Fifeshire; Arthur Burton, M.R.C.S.(Eng.), L.R.C.P.(Lond.), M.D.(Camb.), Cromer, Norfolk; Andrew Croll, M.D.(Edin.), Saskatchewan, Canada; Charles Hotham Evans, L.S.A.(Lond.), M.R.C.S.(Eng.), L.R.C.P.(Lond.), London, W.; George Adams Hicks, M.D.(R. Univ. Irel.), Belfast; Frank Evelyn Jardine, M.B., Ch.B.(Edin.), Penicuik, Midlothian; Kaikobad B. Kanga, L.M.&S. Univ. Bombay, etc.; Hormann Kramer, M.D.(Edin.), etc., Piquetberg, Cape Colony; Henry Ruthven Lawrence, M.D.(Edin.), etc., Edinburgh; Malcolm Edward Mackay, M.D., C.M.(McGill Univ.), Paynton, Sask., Canada; James McPherson, M.B., Ch.B.(Glas.), Captain, Indian Medical Service; Alexander Philp Mitchell, M.D.(Edin.), etc., Edinburgh; John Barre de Winton Molony, M.B., Ch.B.(Edin.), London; John Ignatius Parer, M.B., Ch.B.(Melbourne), Edinburgh; George Reynolds Petersen, M.D., C.M.(McGill Univ.), etc., Saskatoon, Sask., Canada; Douglas Rodger, M.B., Ch.B. (Vict. Univ. Manc.), Manchester; Behram P. Sabawala, L.M.&S.(Bombay), etc., Bombay; Lessel Philip Stephen, M.B., Ch.B.(Aberd.), Major, Indian Medical Service; George Hector Urquhart, L.R.C.S.E., etc., Eskbank, Midlothian; Ernest Alexander Walker, M.B., Ch.B.(Edin.), Captain, Indian Medical Service; and Nelson Wood-Hill, M.R.C.S.(Eng.), L.R.C.P.(Lond.), Tiverton, Devon.

The Bathgate Memorial Prize in Materia Medica was awarded to Miss Rachel Mary Barclay, 7 Archibald Place, Edinburgh; and the Ivison Macadam Memorial Prize in Chemistry to Mr. Frank Bertram Macaskie, 40 Marchmont Crescent, Edinburgh.

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